

SDRENSSEN
POWER SUPPLIES

R1C

Instruction Manual

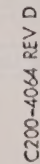
Sorensen Company

676 Island Pond Road
Manchester, N.H. 03103

Tel: 603-668-4500

Twx: 710-220-1339

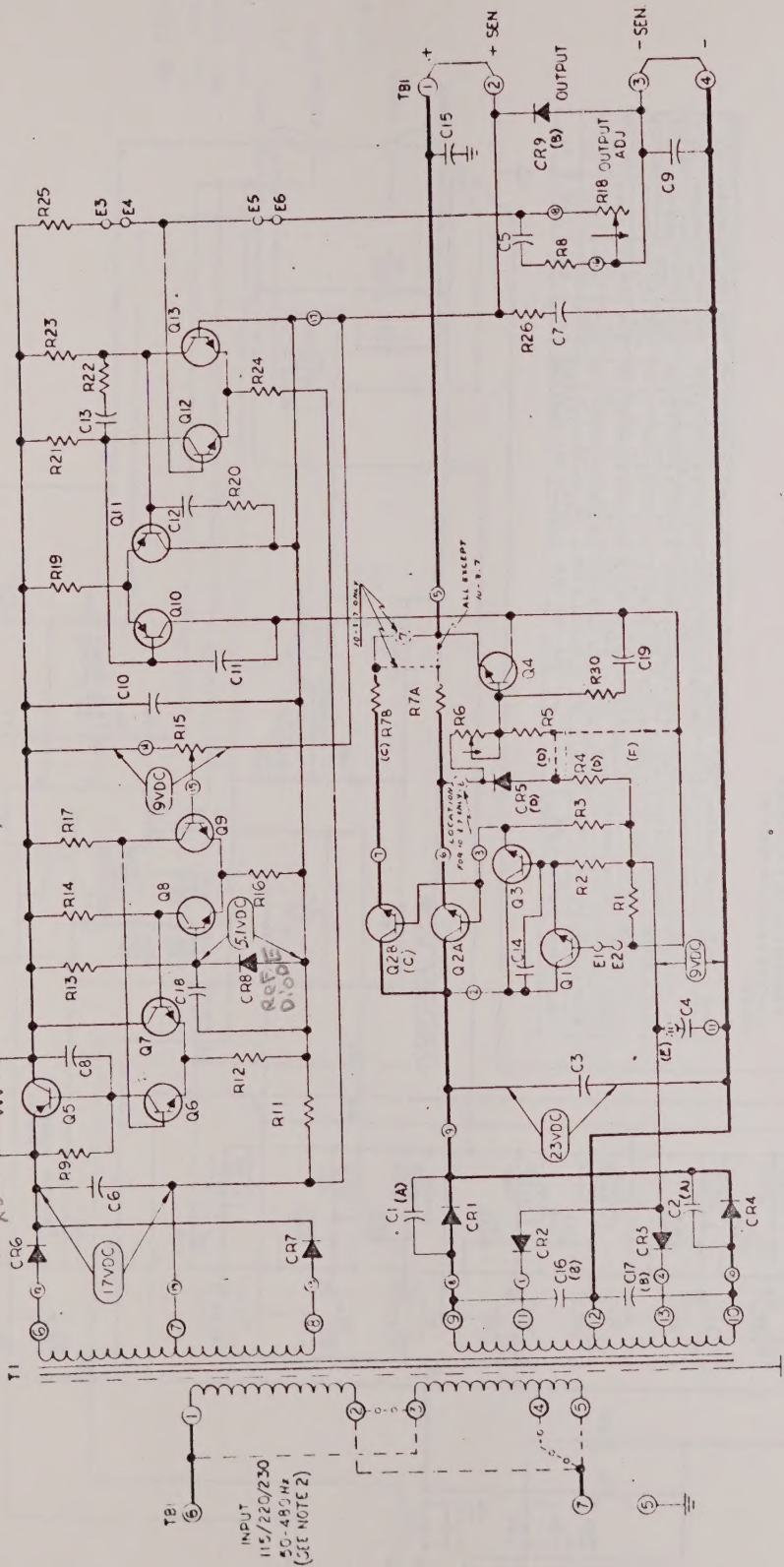
A Raytheon Company



1. ALL VOLTAGES MEASURED AT NOMINAL INPUT, NOMINAL OUTPUT, NO LOAD
2. SEE FIGURE 2-1 FOR INPUT CONNECTIONS

FIGURE 5-2 C. SCHEMATIC DIAGRAM,
120-VOLT MODEL

REF. SUPPLY 10-1
FOR PRELIMINARY
DESIGN



C200-3960 Rev F

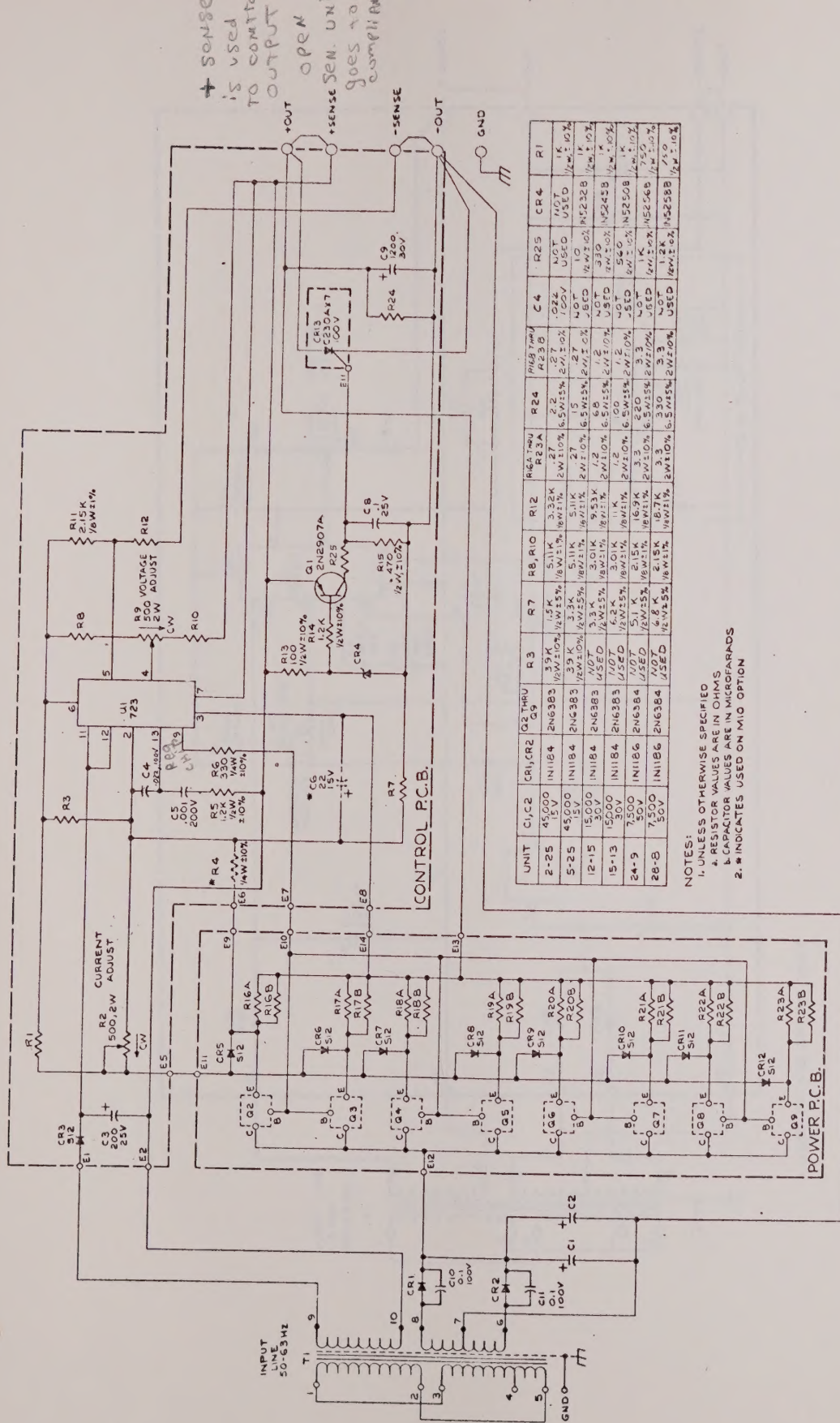
NOTES:

- (A) Used on 5-6.4/10-1.4 only.
 - (B) Used on 10-2.2/10-3.7 only.
 - (C) Not used on 10-1.4.
 - (D) Not used on 5-6.4.
 - (E) Terminal used here on 5-6.4/10-3.7 only.
 - (F) Connection used on 5-6.4 only.
- 1) All voltages measured at nominal input, nominal output, no load.
 - 2) See Figure 2-1 for input connections.



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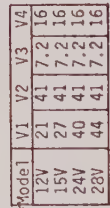
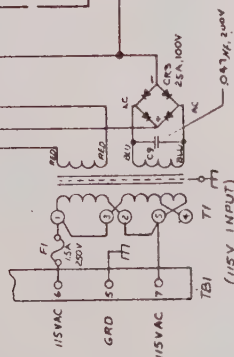


UNIT	C1,C2	CR1,CR2	Q1, Q2	R3	R7	R8,R10	R12	R24	R25	C4	CR4	R1
2-25	45,000 15V	IN1184	2N6383	39K 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%
5-25	45,000 15V	IN1184	2N6383	39K 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%
12-15	15,000 30V	IN1184	2N6383	450 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%
15-13	15,000 30V	IN1184	2N6383	450 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%
24-9	7,500 50V	IN1186	2N6384	100 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%
28-8	7,500 50V	IN1186	2N6384	100 1/2W, 10%	5.1K 1/2W, 10%	5.1K 1/2W, 10%	3.3K 1/2W, 10%	2.2K 1/2W, 10%	NOT USED	NOT USED	NOT USED	1K 1/2W, 10%

NOTES:
 1. UNLESS OTHERWISE SPECIFIED
 A. RESISTOR VALUES ARE IN OHMS
 B. CAPACITOR VALUES ARE IN MICROFARADS
 2. * INDICATES VALUES USED ON MICRO OPTION

Dwg. D167485 Rev. E

SOC Module F Series Schematic Diagram

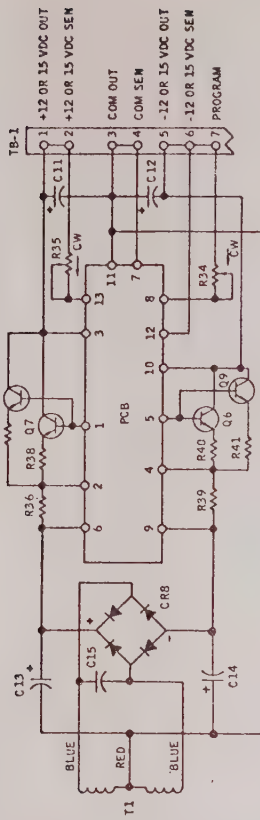


DC voltages at no load,
115-VAC input

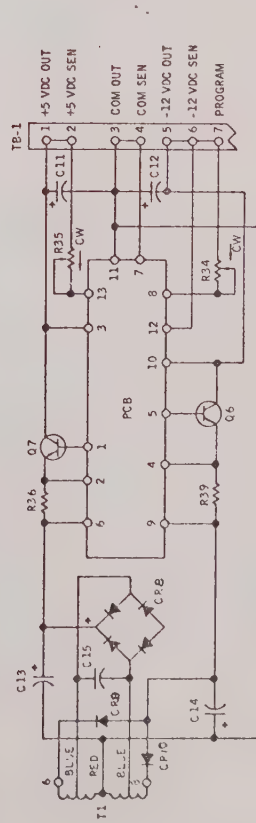
Figure 5-1 (B) - Typical 12V, 15V, 24V, 28V Schematic Diagram (Module II)

15th
1st
1st

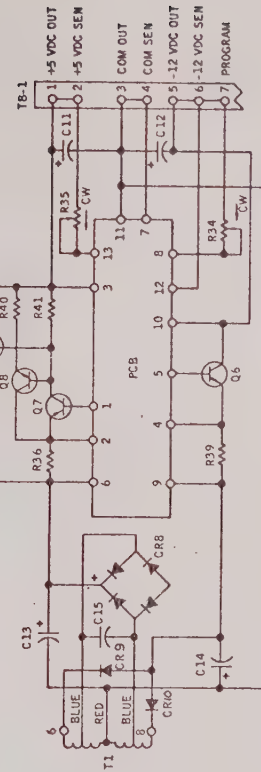
+ ALWAYS TEST -
 PULLS ADJUST - FIRST, THEN +



MODULE III
12-3D
15-2 BD



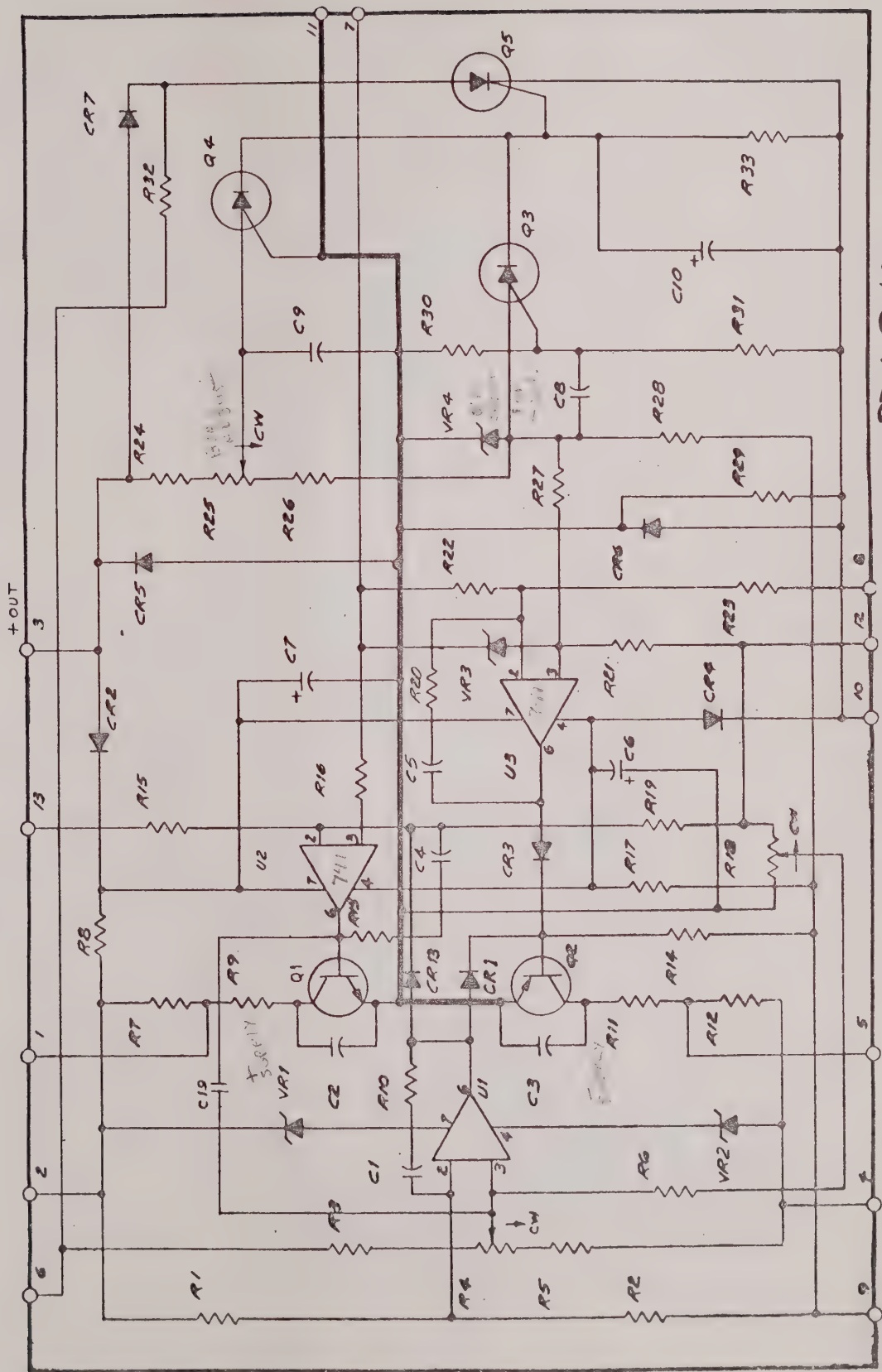
MODULE II
5/12 D2



MODULE III
5/12D3

Figure 5-1 Partial Schematic Diagrams

PTM DUAL



PTM DUAL



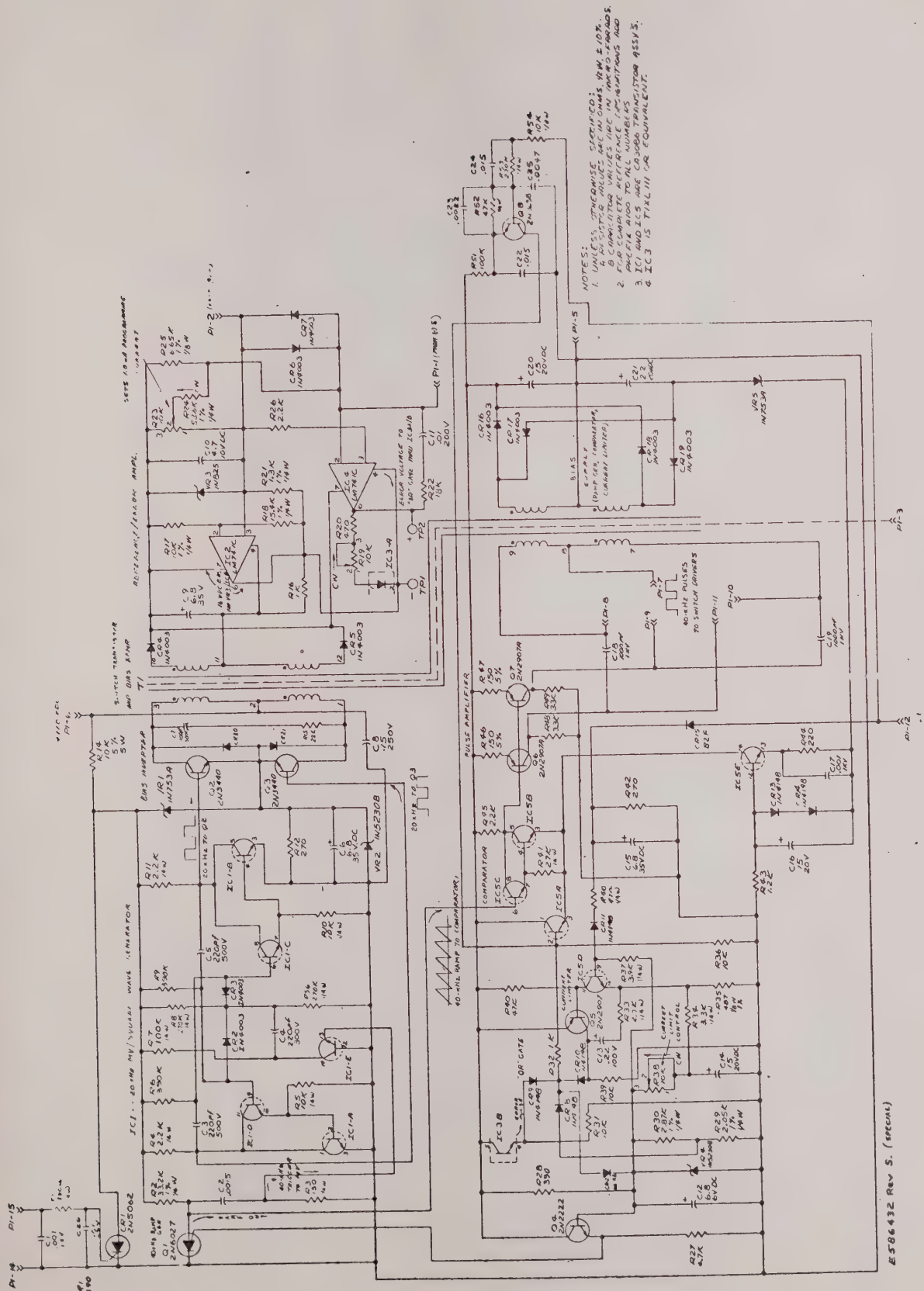
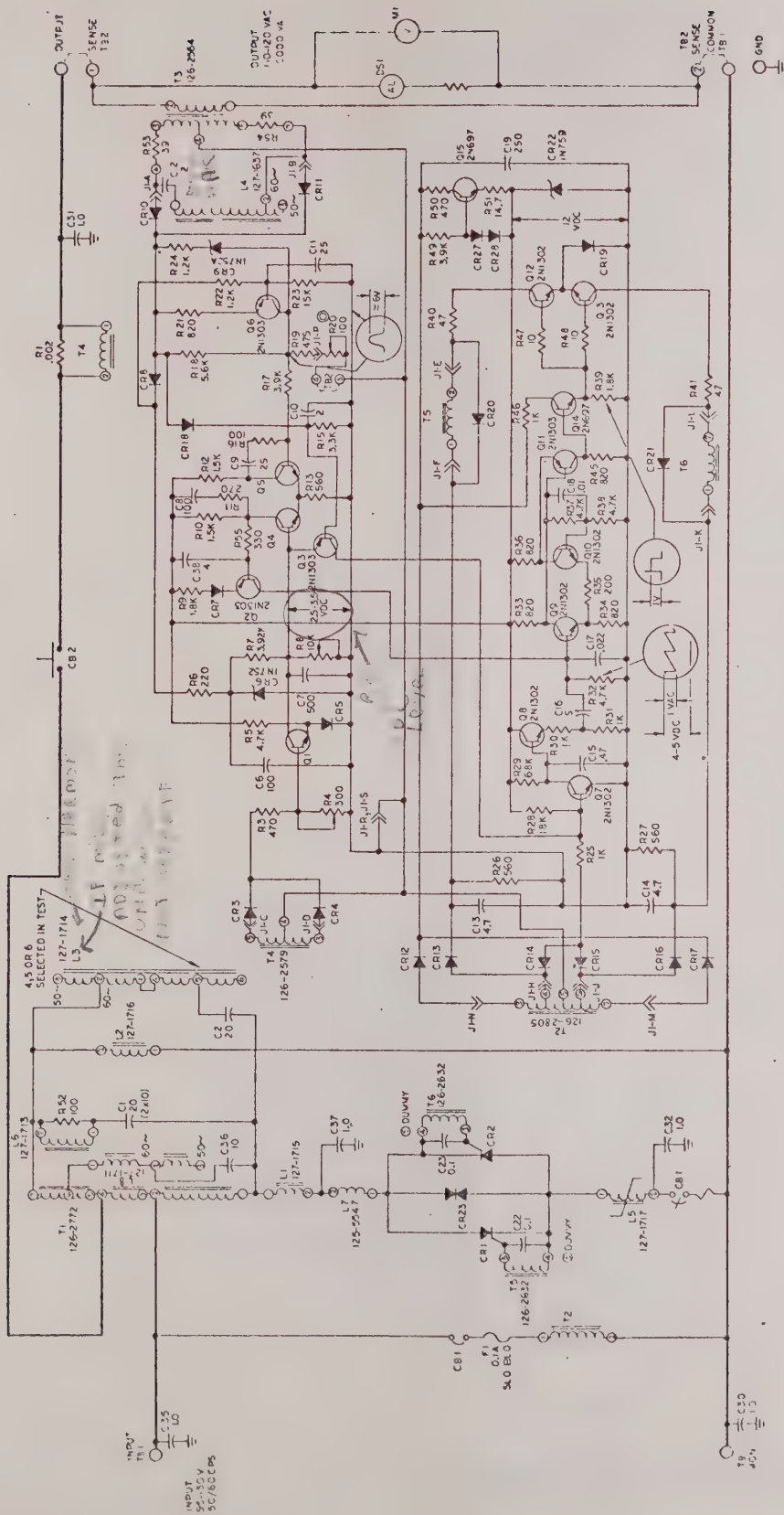
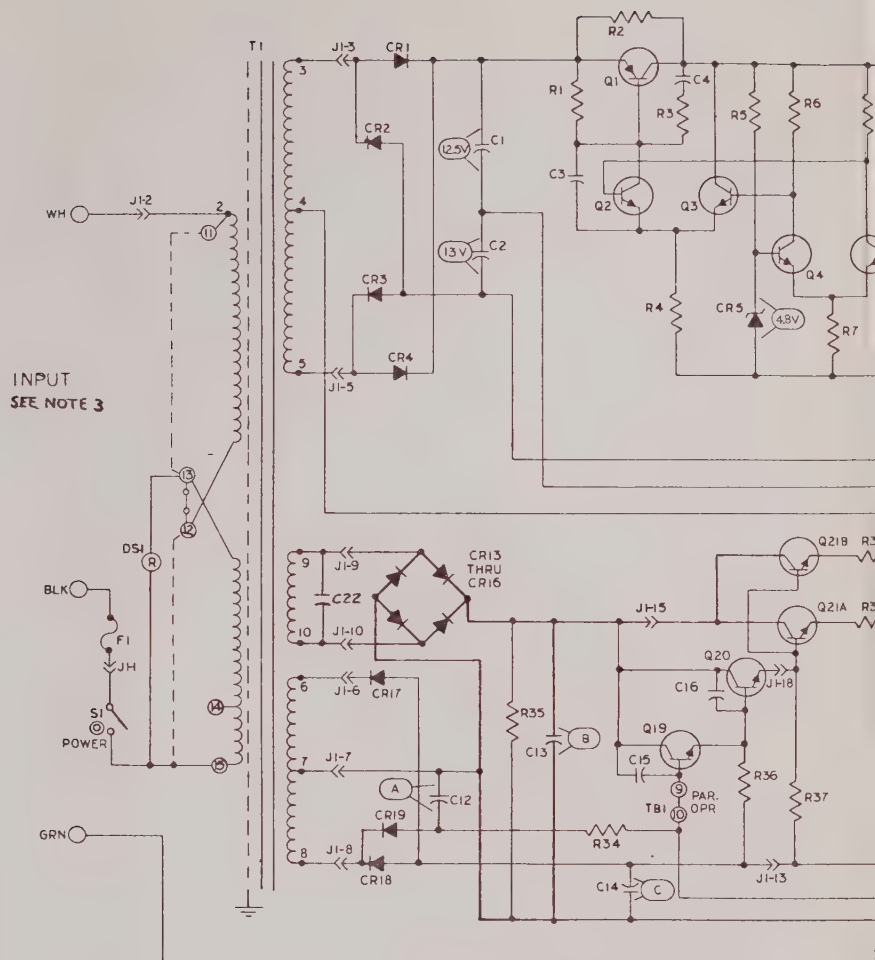


FIGURE 5-68
(A100) PRINTED CIRCUIT BOARD SCHEMATIC
(MODULES 111/111A)

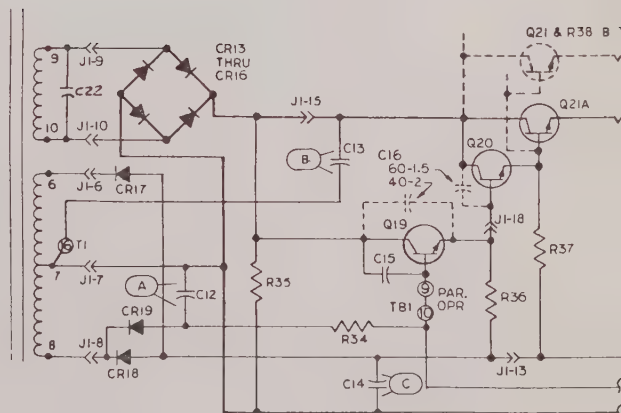


NOTES:
 1. ALL VALUES EXPRESSED IN OHMS OR MICROHMS UNLESS OTHERWISE SPECIFIED.
 2. Ⓢ DENOTES FRONT PANEL CONTROL.

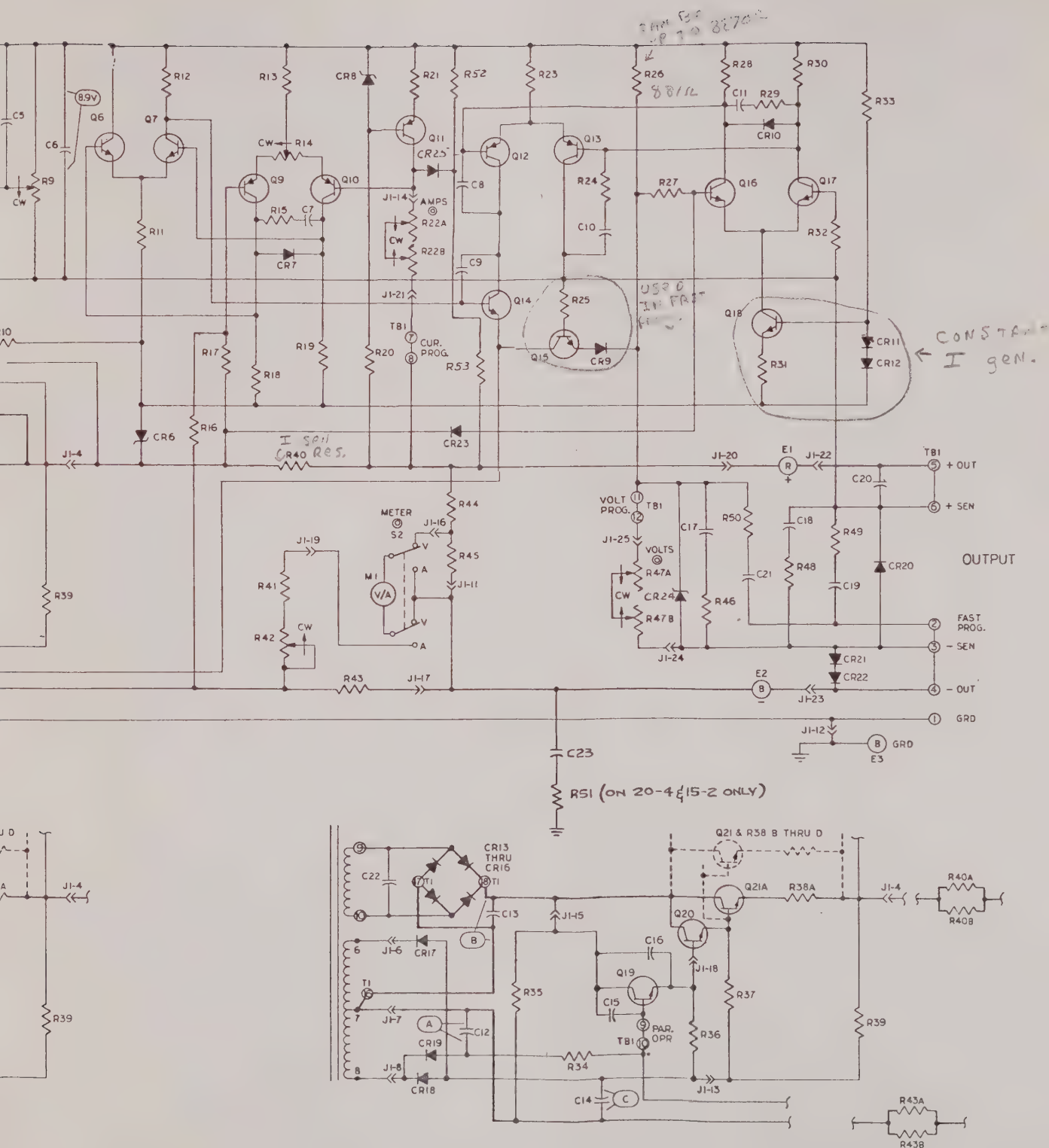
Figure 5-1C, ACR 10000 Schematic Diagram
 (Typical ACR 7500, 15000)



MODEL	VOLTAGE		
	A	B	C
15-2	21	31	19
30-1	42	53	39
40-.75	49	71	46
60-.5	69	98	67
20-4	25	36	22
40-2	49	66	46
60-1.5	69	88	67



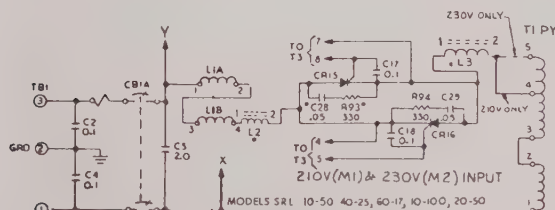
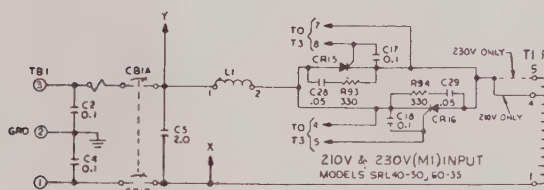
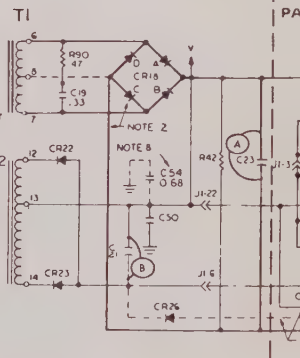
POWER CIRCUIT MODELS QRD40-2 & 60-1.5



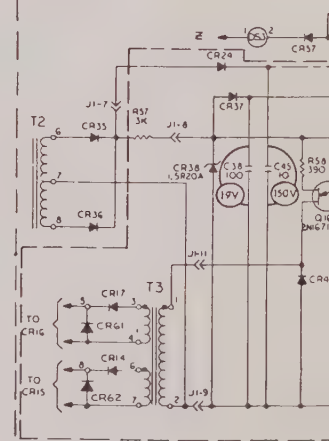
NOTES

1. ALL VOLTAGES MEASURED AT NO LOAD, FULL OUTPUT VOLTAGE AND NOMINAL INPUT
2. ① DENOTES FRONT-PANEL CONTROL
3. SEE FIG. 2-3 FOR INPUT-CONNECTION DETAILS

FIGURE 5-3. SCHEMATIC DIAGRAM

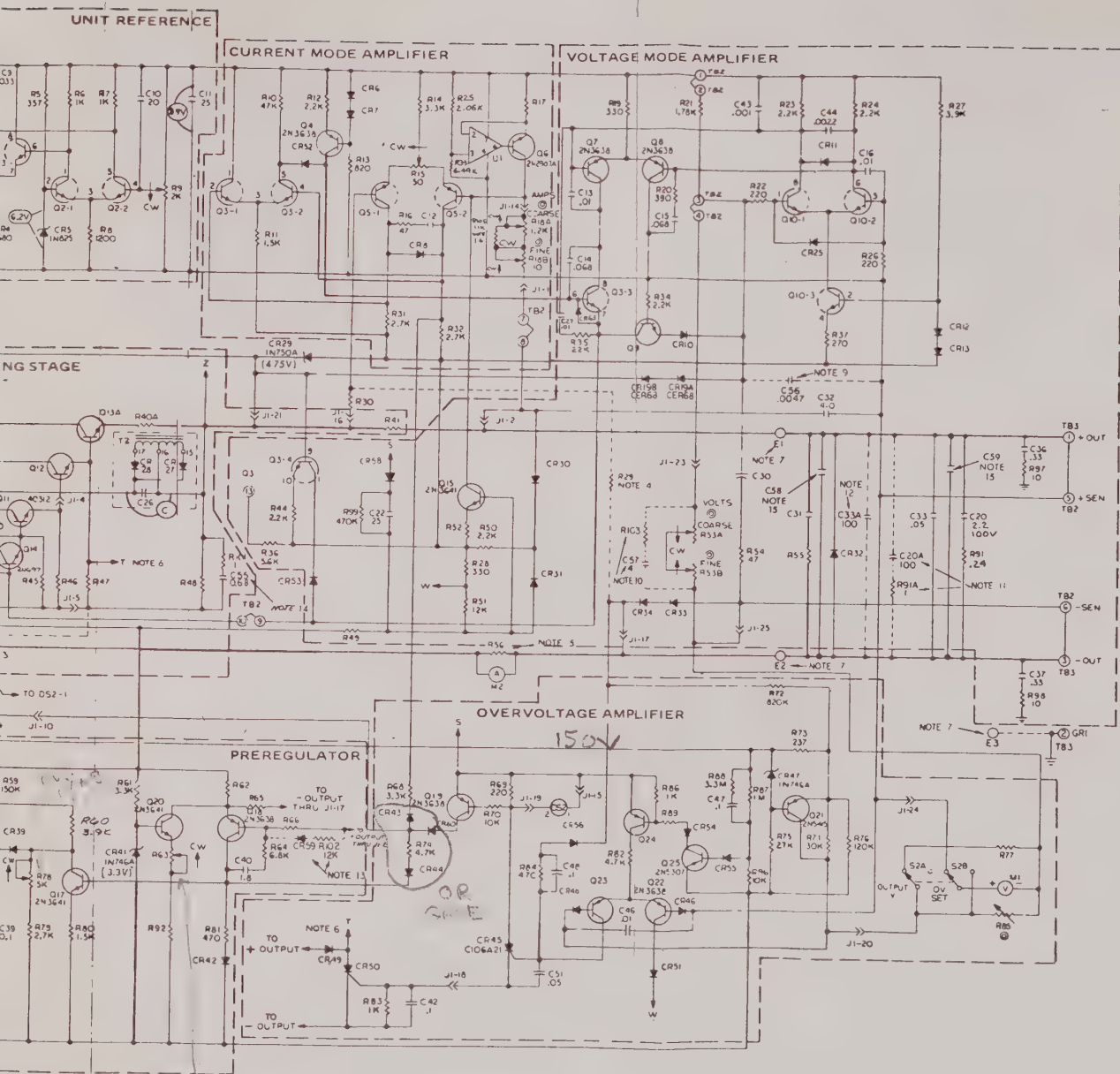


*DELETE C28,R93. CHANGE VALUE OF R94 TO 680.
ADD L2 & L3 FOR 10-50, 40-25, & 60-17 ONLY



UNIT	C12	C13	C21	C23	C60	C25	C26	C30	C31	C50	Q 9	Q 12	Q 13	Q 23	Q 24
10-50	.22	.01	15K	7 X 69K	.047	.001	9.6K	.01	6.4K	.015	2N 697	2N 3055	2N 3771 (4)	2N 3638	2N 3638
10-100	.22	.01	25K	8 X 85K	.047	.001	21K	.015	26K	.33	2N 697	2N 3771	2N 3771 (7)	2N 3638	2N 3638
20-50	.01	.01	15K	7 X 26K	.01	.001	9.6K	.0033	6.7K	.33	2N 697	2N 3055	2N 3771 (5)	2N 3638	2N 3638
40-25	1	.01	7.8K	6 X 44K	.01	.001	21K	.0022	8.5K	.33	2N 697	2N 3055	2N 3771 (4)	2N 3638	2N 3638
40-50	1	.01	8.7K	6 X 21K	.01	.001	21K	.0022	8.5K	.33	2N 697*	2N 3055	2N 3771 (5)	2N 3638	2N 3638
60-17	1	.01	4.7K	4 X 6.5K	.01	.001	9.6K	.001	2.5K	.33	40321	2N 3055	2N 3442 (4)	2N 3638	2N 3638
60-33	1	.01	4.7K	8 X 6.5K	.01	.001	21K	.0022	6.5K	.33	40321	2N 3055	2N 3442 (8)	2N 3638	2N 3638

DWG. E586246-REV. H



- Notes:**
1. CB 1-8 used only on 10-100 and 20-50 (115 Input) of this group.
 2. CR18C and D not used on 20-50, 10-50, 10-100 and indicated lead is wired to T-1-8.
 3. CR26 relocated to dotted position on models 10-50, 10-100, 20-50 and 40-50.
 4. R29 not used on 10-50, 10-100, 20-50, 40-50, 60-35.
 5. Shunt R56 used on units 35 amp output and up.
 6. CR49 inserted and indicated lead "T" used only on 40-25, 40-50, 60-17 and 60-35.
 7. E1, E2 and E3 not used on models 20-50, 40-50, 60-35, and 10-100.
 8. C54 used only on 10-50, 40-25 and 60-17.
 9. C56 used only on 10-100 and 40-50.
 10. C57 and R103 used only on 10-100, 60-35.
 11. C20A and R91A used only on 20-50.
 12. C33A used only on 40-50 and 10-100.
 13. CR59 and R102 used only on 60-17 and 60-35.
 14. C55 is 2.0μF 200V and R101 is short circuit for model SRL 40-25.
 15. Add C58 and C59 for 10-50, 40-25, 60-17 only (M1 & M2).
 16. R105 MAY BE OMITTED IN SOME UNITS, AS DETERMINED BY TEST LIMITS.
- UNIT**
- | UNIT | 115V | 210V | 230V |
|--------|-------------------|-----------|------|
| 10-50 | 2.0A SB 1 1/4A SB | 1 1/4A SB | |
| 10-100 | 4.0A SB 1 1/4A SB | 2 1/4A SB | |
| 20-50 | 2.0A SB 1 1/4A SB | 1 1/4A SB | |
| 40-25 | 2.0A SB 1.0A SB | 1.0A SB | |
| 40-50 | 2.0A SB 2 1/4A SB | 2 1/4A SB | |
| 60-17 | 1.5A 1A | 1A | |
| 60-35 | 1 1/4A SB | 1 1/4A SB | |

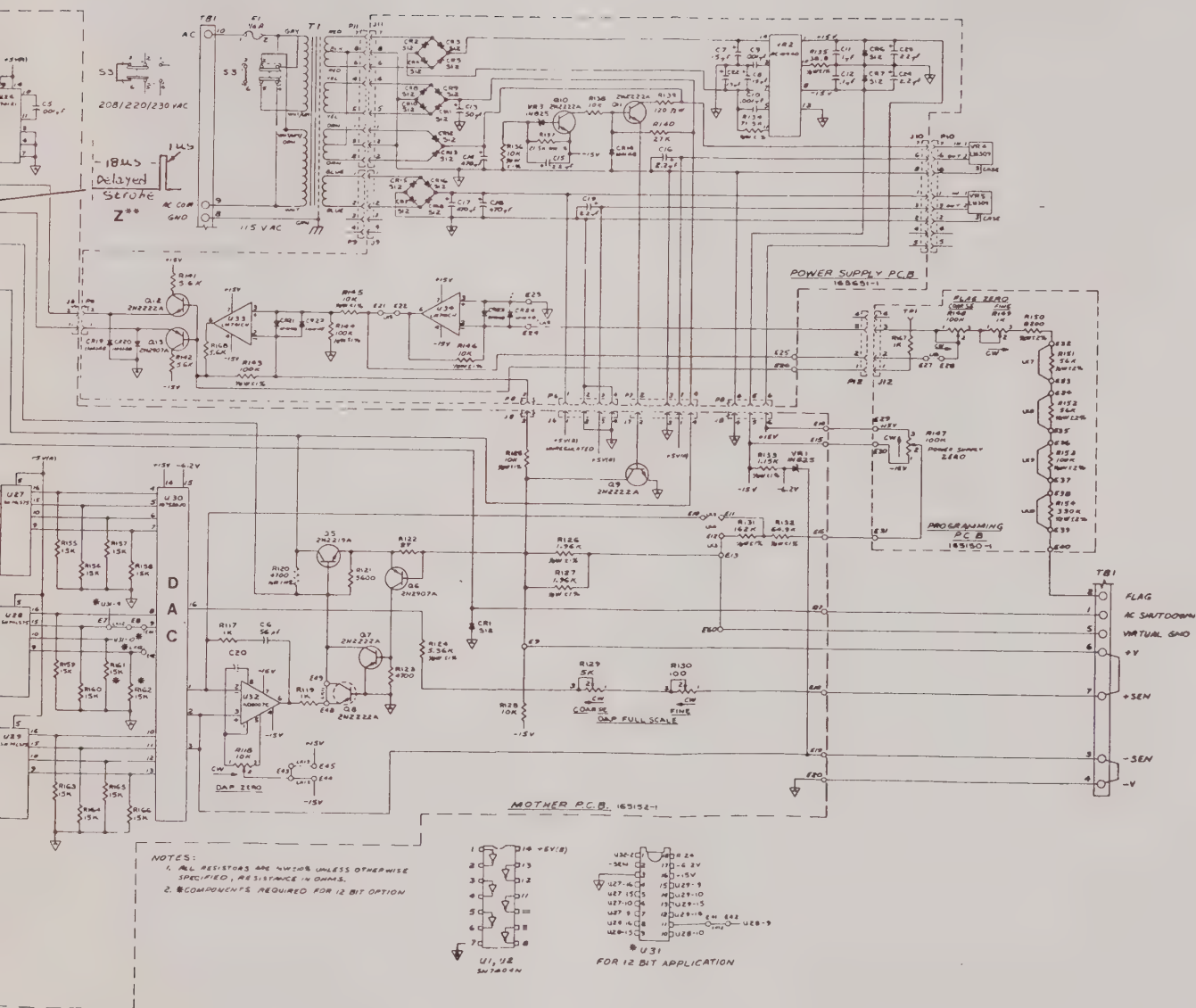
VOLTAGE CHART

MODEL	A (C23)	B (C21)	C (C26)
10-50	15.5	14	11
10-100	15.5	14	11
20-50	27.0	14	11
40-25	50.0	27	9
40-50	48.5	27	9
60-17	73.7	27	9
60-35	73.4	27	9

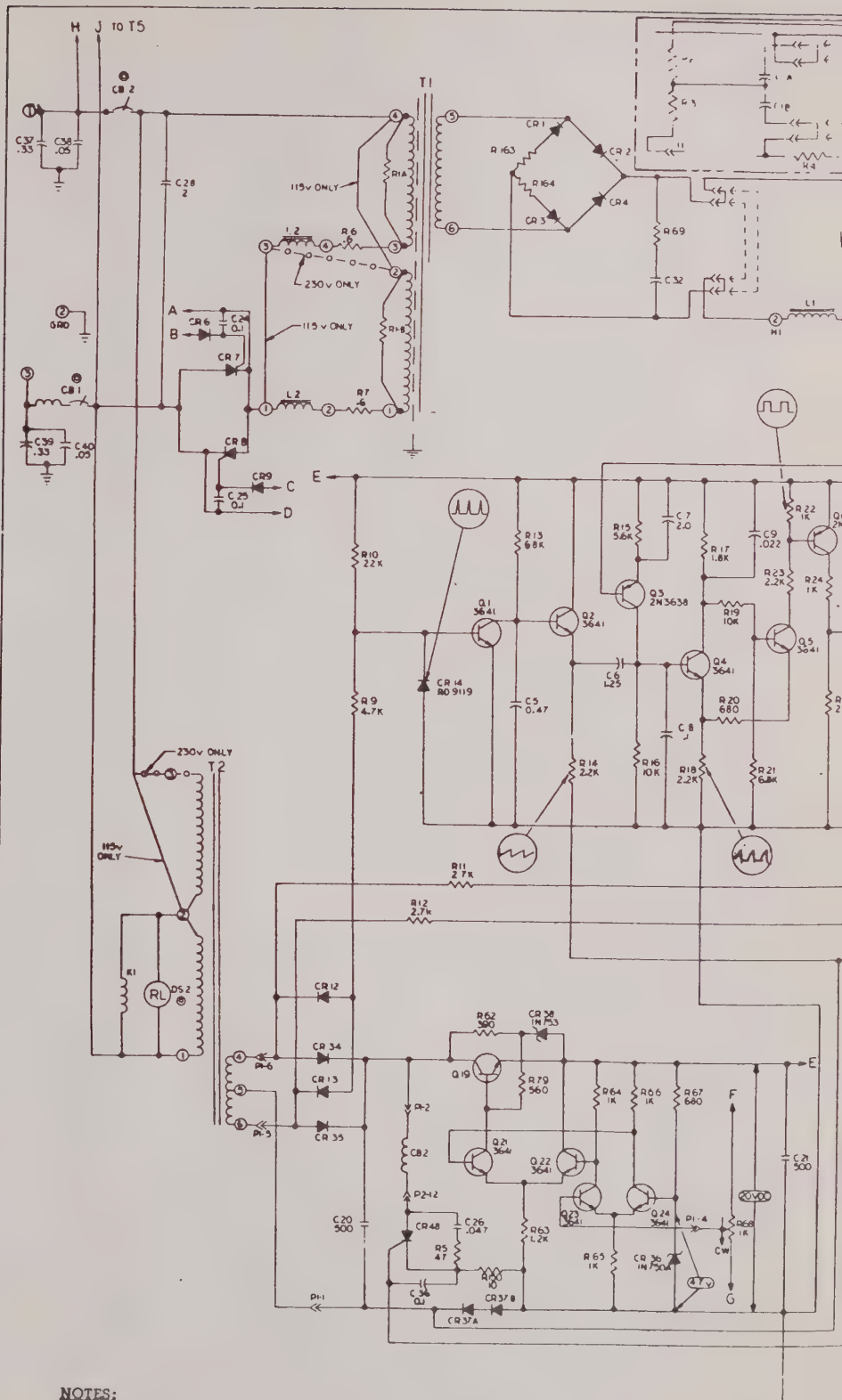
FIGURE 6-2
SCHEMATIC DIAGRAM
SRL POWER SUPPLIES



Ref. para. 4.2.1 / 4.2.2

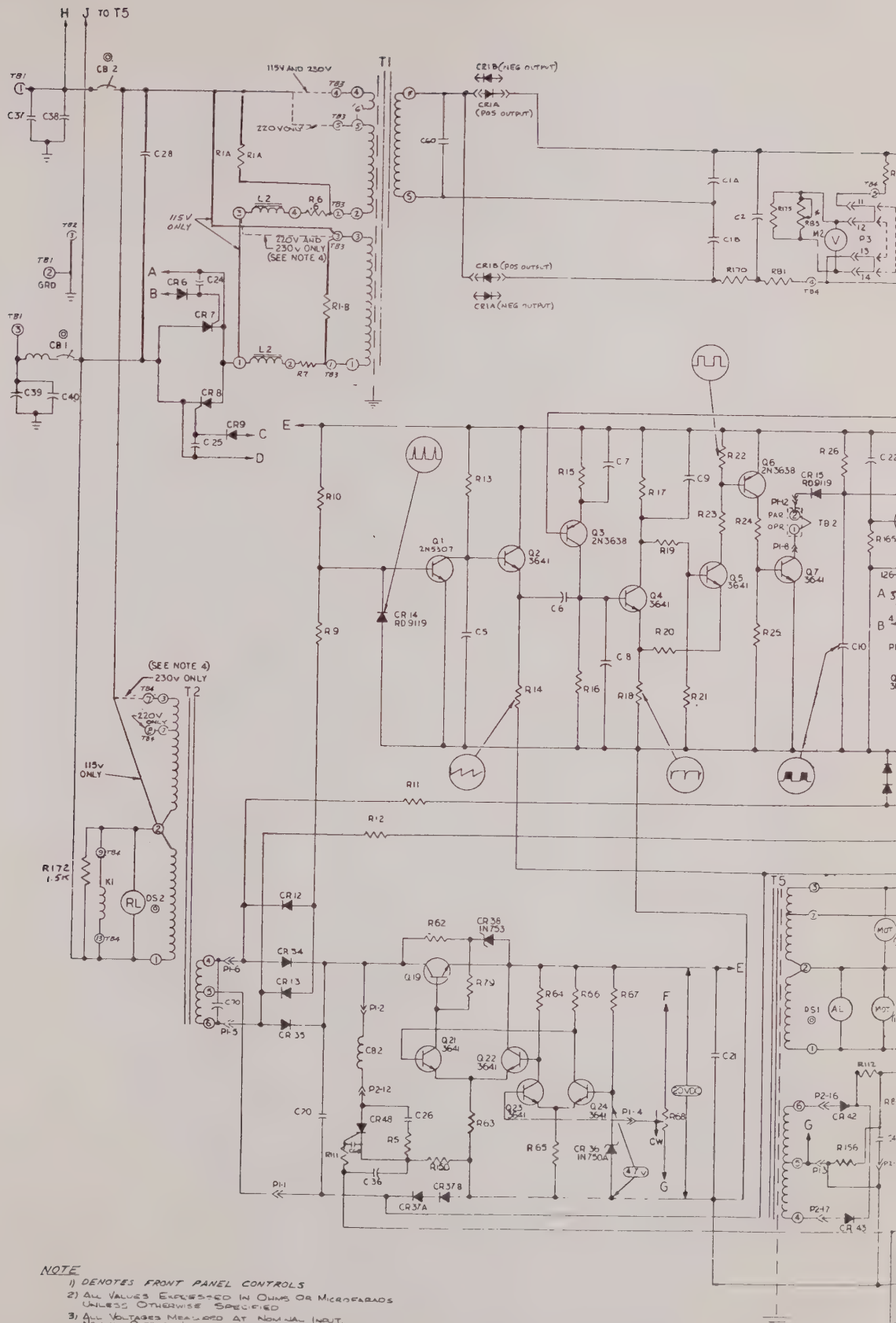


DAP
 Figure 6-1
 Digital-to-Analog Programmer
 System Schematic Diagram
 DWG J165159 Rev. C



NOTES:

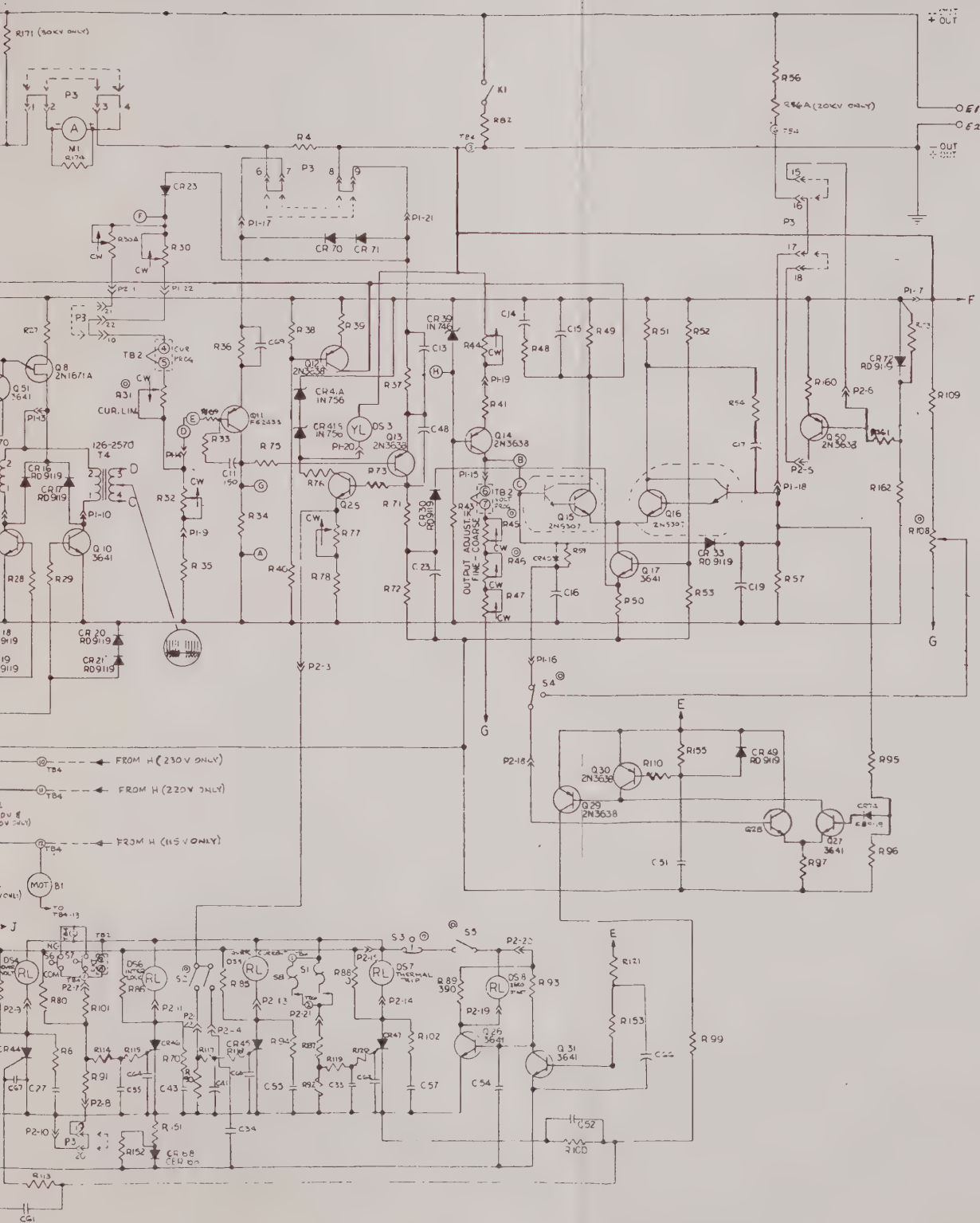
1. Ⓢ denotes front panel controls.
2. All values expressed in ohms or microfarads unless otherwise specified.
3. All voltages measured at nominal input, nominal output, no load.
4. -0-0- denotes connection for 230 V input only. 230 V input following components change CR7, CR8, & CB1.



NOTE

- 1) DENOTES FRONT PANEL CONTROLS
- 2) ALL VALUES EXPRESSED IN OHMS OR MICROFARADS UNLESS OTHERWISE SPECIFIED
- 3) ALL VOLTAGES MEASURED AT NOMINAL INPUT, NOMINAL OUTPUT, NO LOAD
- 4) THE 230V CONNECTIONS, ARE 'M1' FACTORY MODIFICATIONS
- 5) POLARITY SHOWN IS POSITIVE OUTPUT.

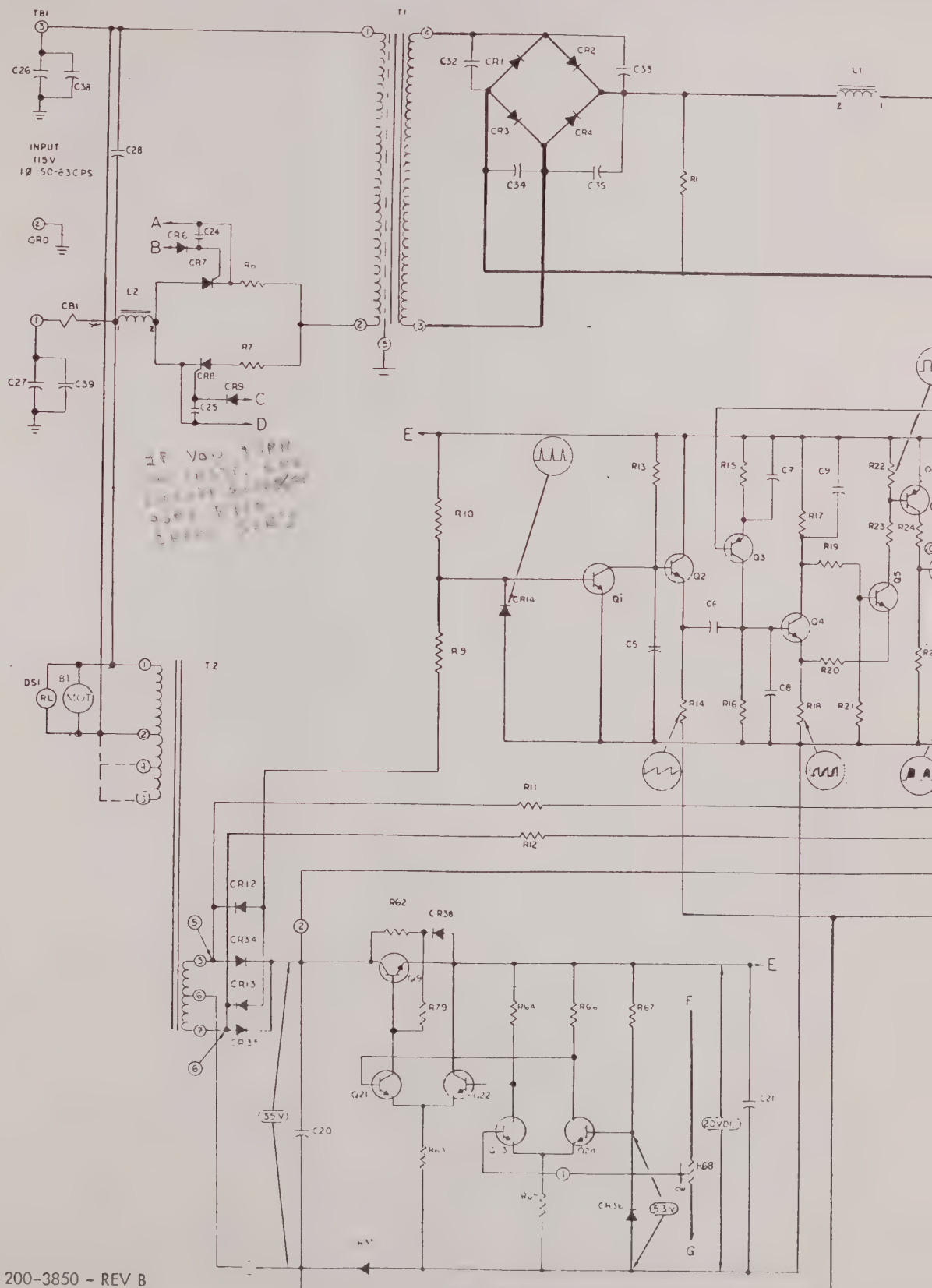
230 V INPUT FOLLOWING COMPONENTS CHANGE CR7, CR8 & CB1

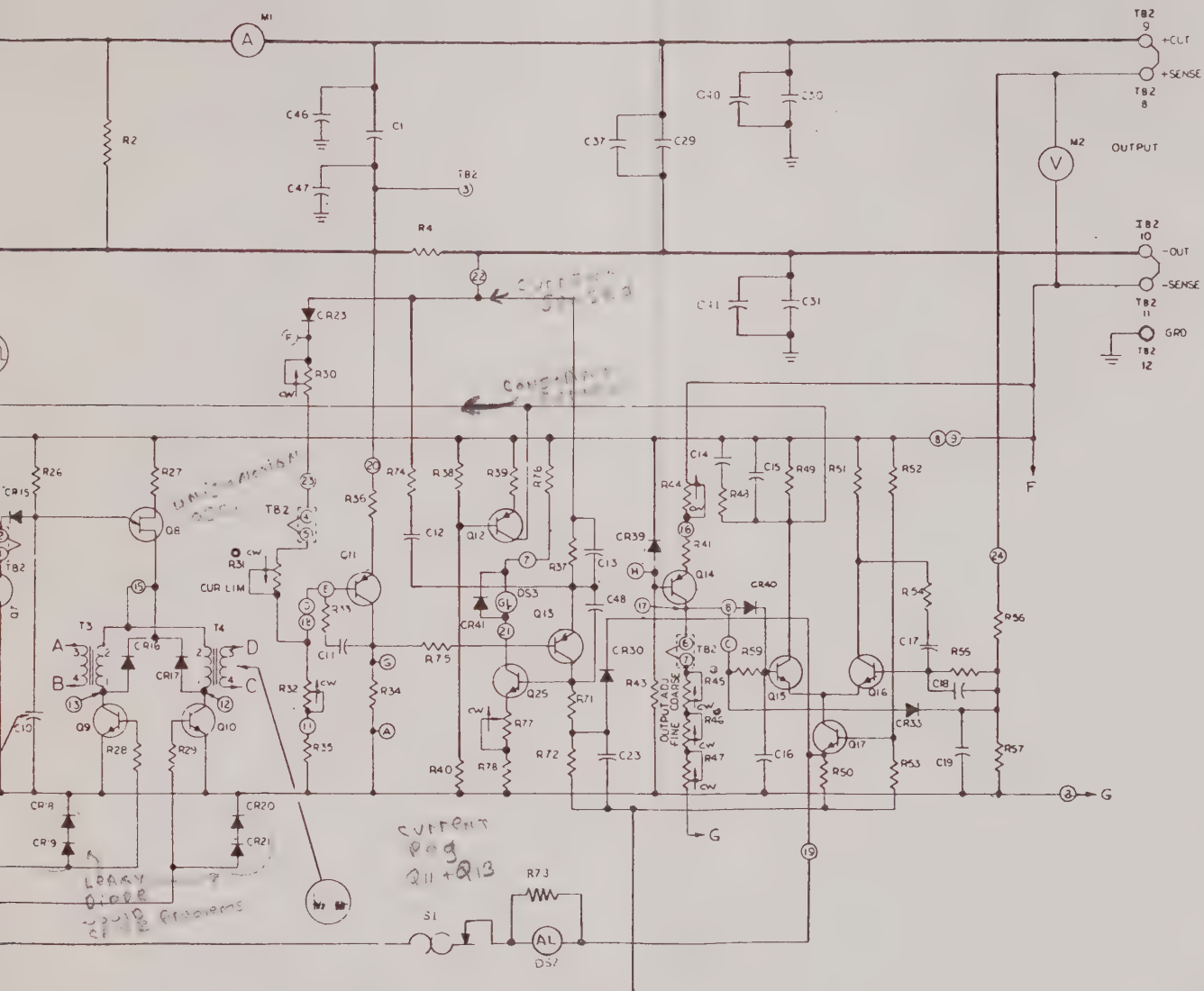


Serial No 100 To

DCR HIGH VOLTAGE MODELS 12KV 20KV, 30KV.

ABLE TO 30KV UNIT

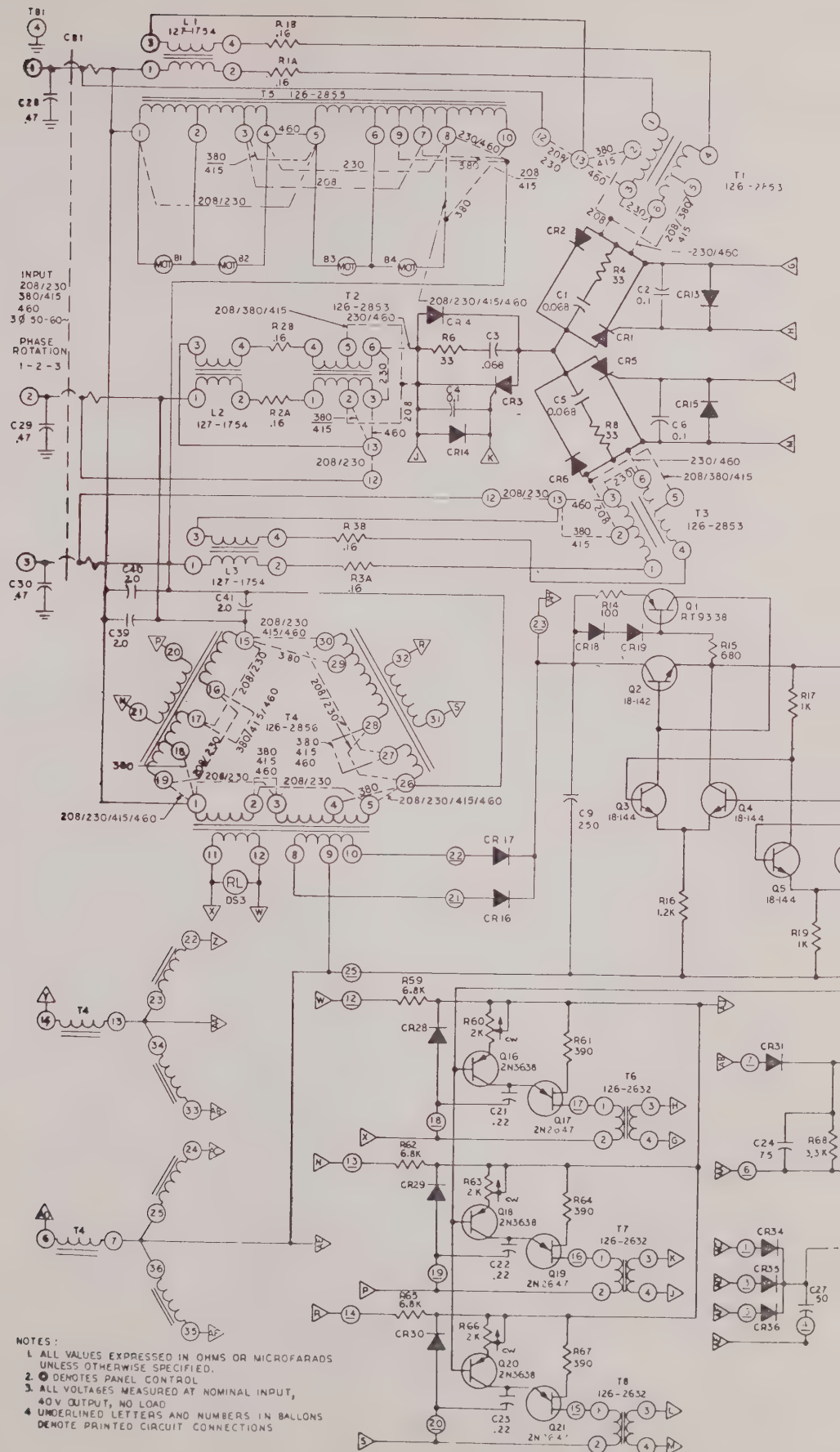




NOTES

1. Ⓞ DENOTES FRONT PANEL
2. ALL VOLTAGES MEASURED AT NOMINAL INPUT, NOMINAL OUTPUT AND NO LOAD.

DCRA 10
FIGURE 5-4. SCHEMATIC DIAGRAM



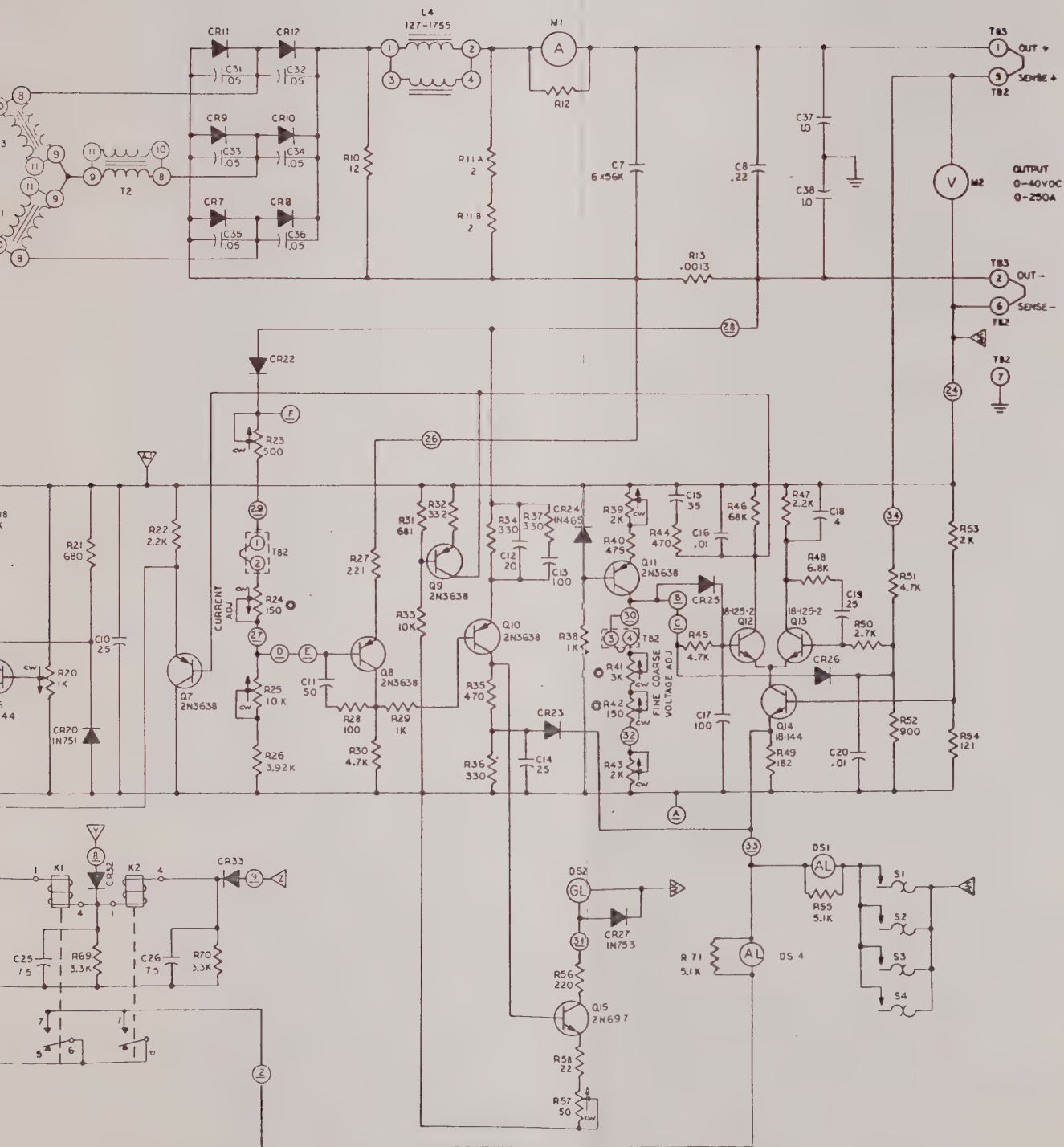
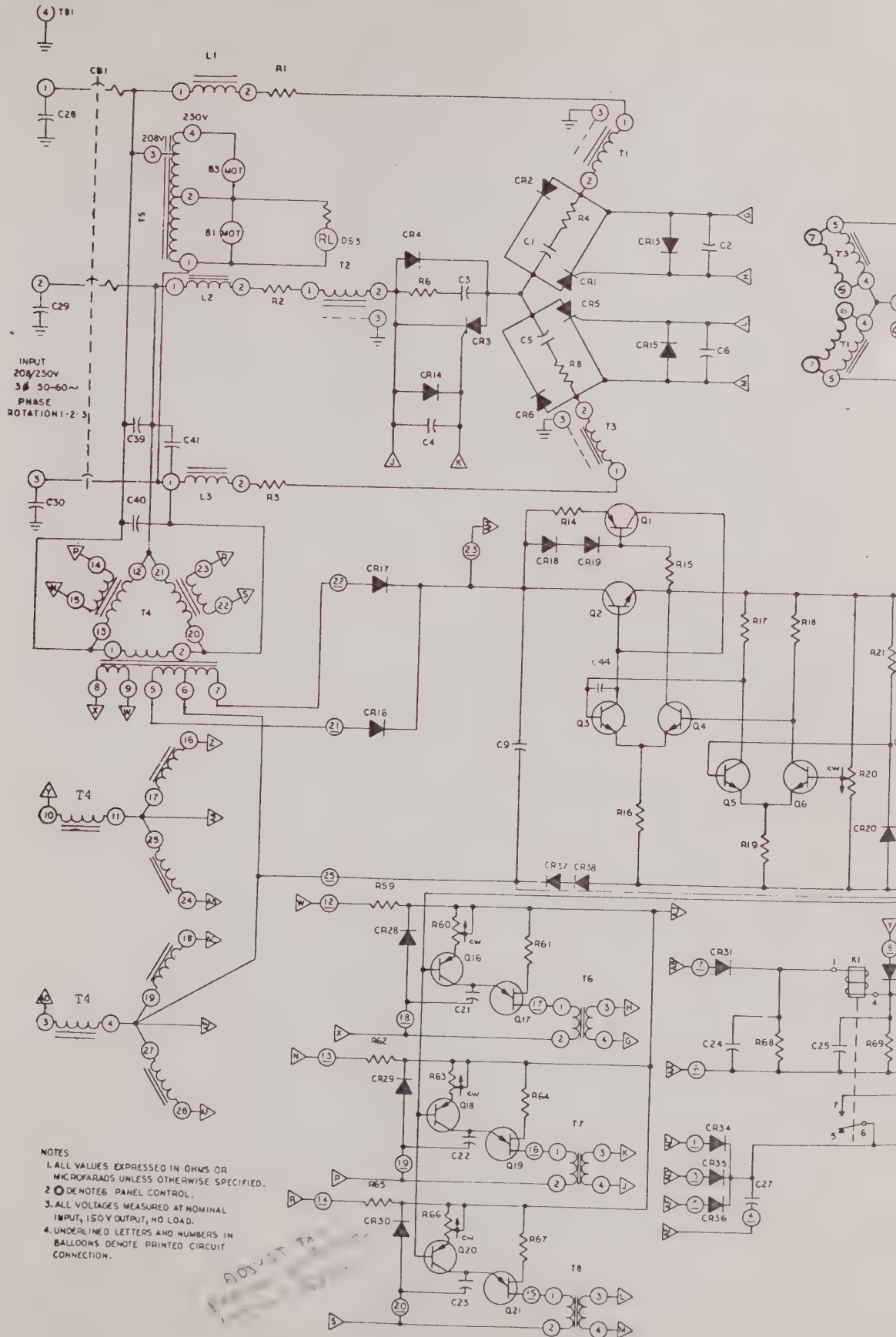


FIGURE 5-3. Unit Schematic, DCR 40-250A 30



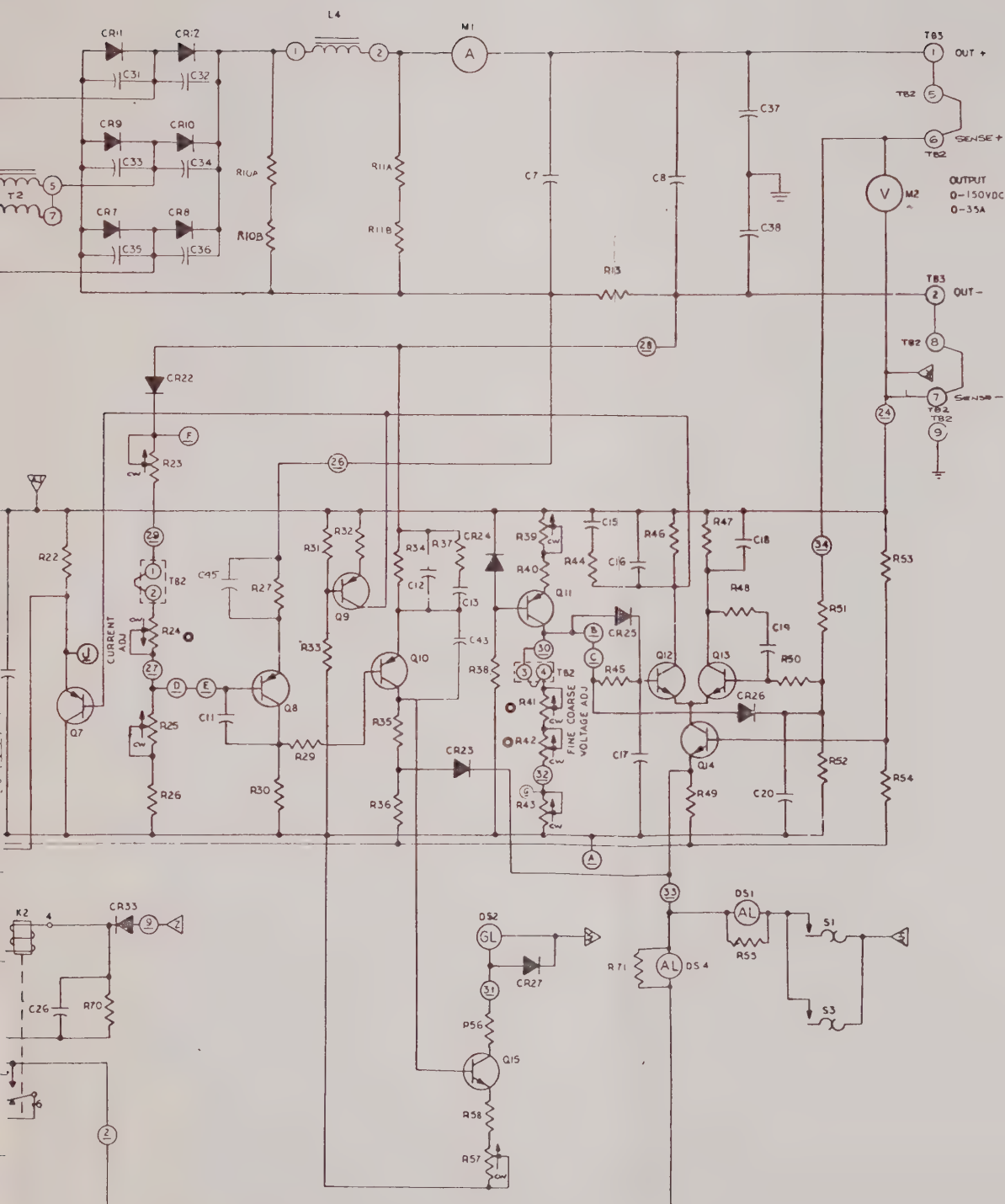
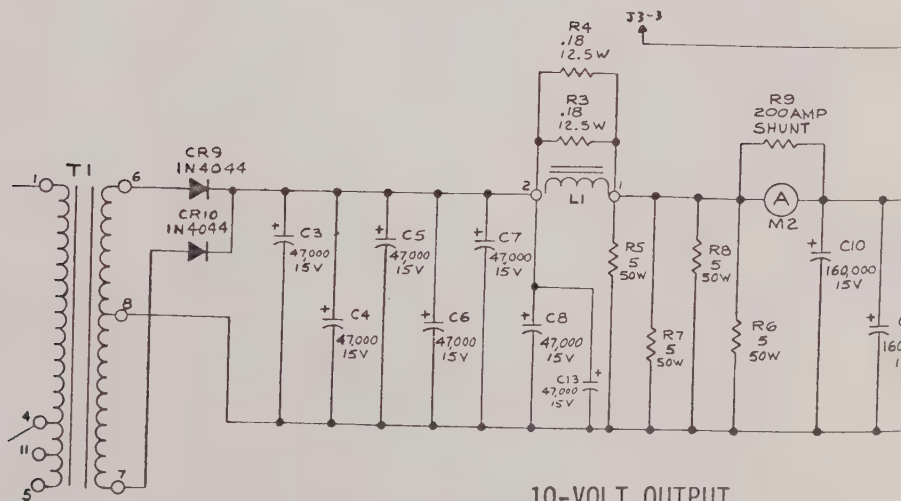
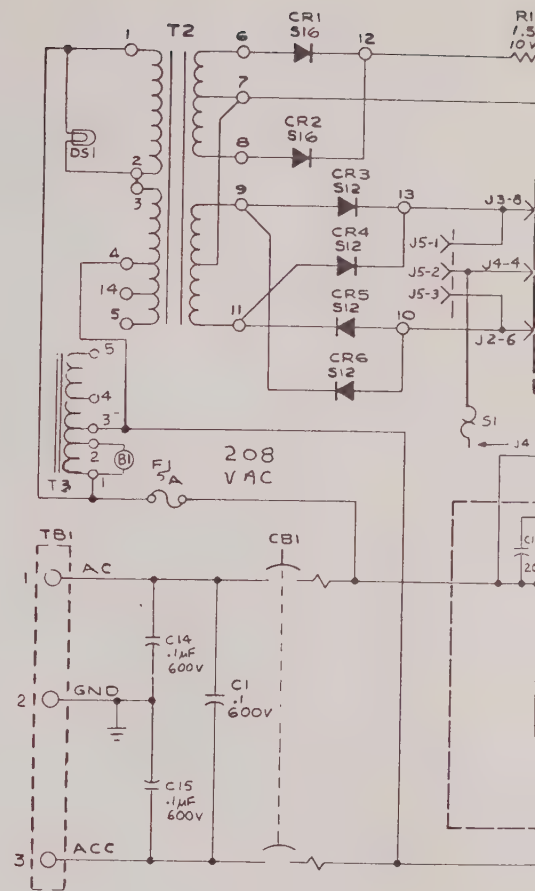
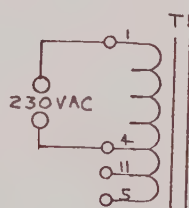
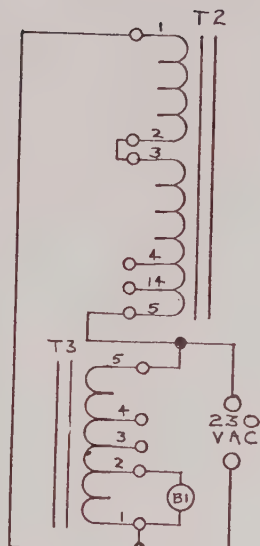
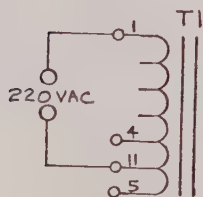
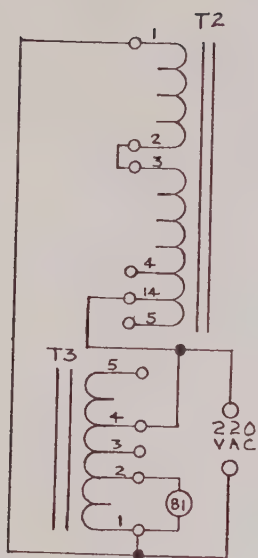


FIGURE 7-2. UNIT SCHEMATIC - MODEL DCR 150-35A 30



10-VOLT OUTPUT

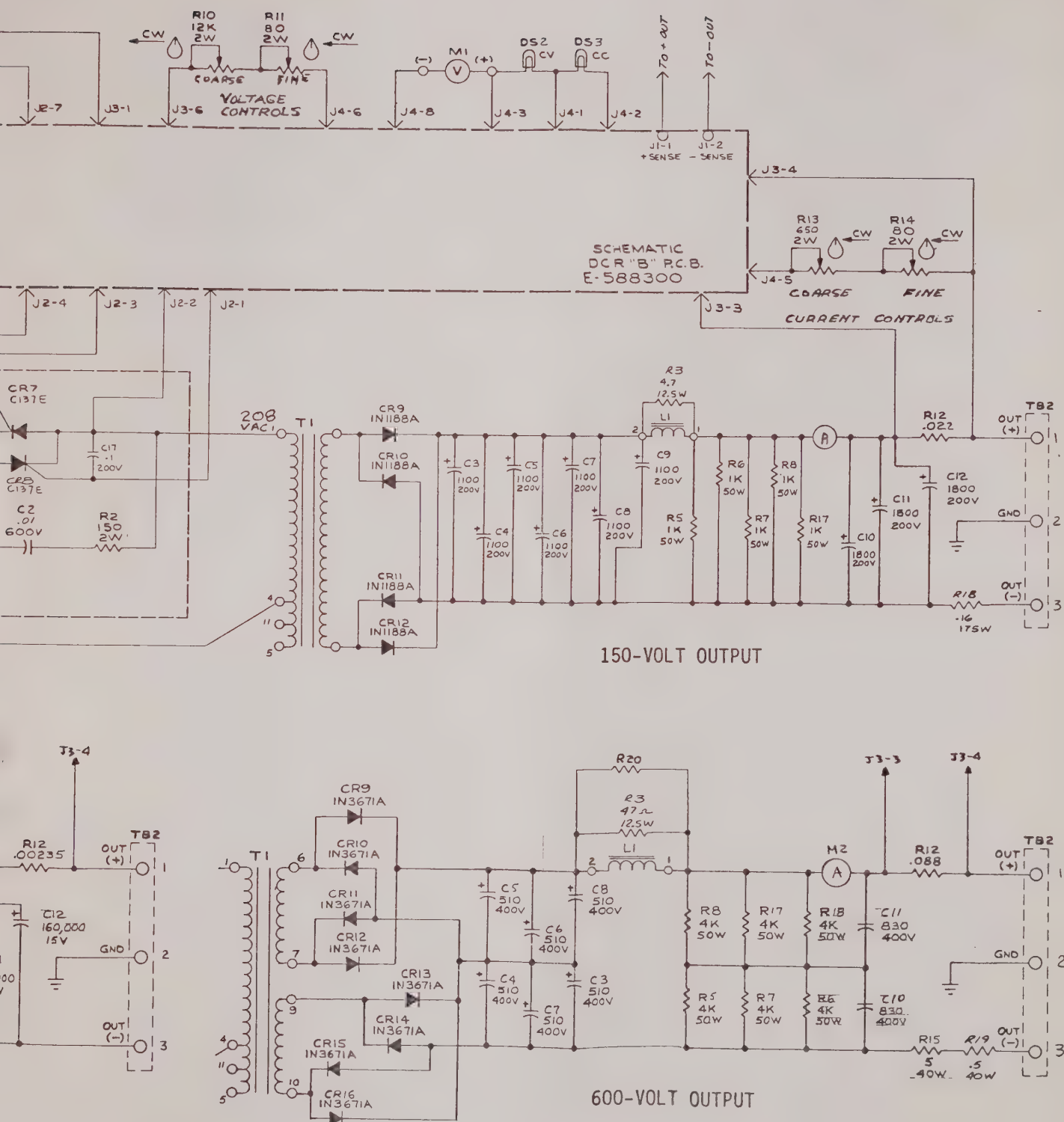
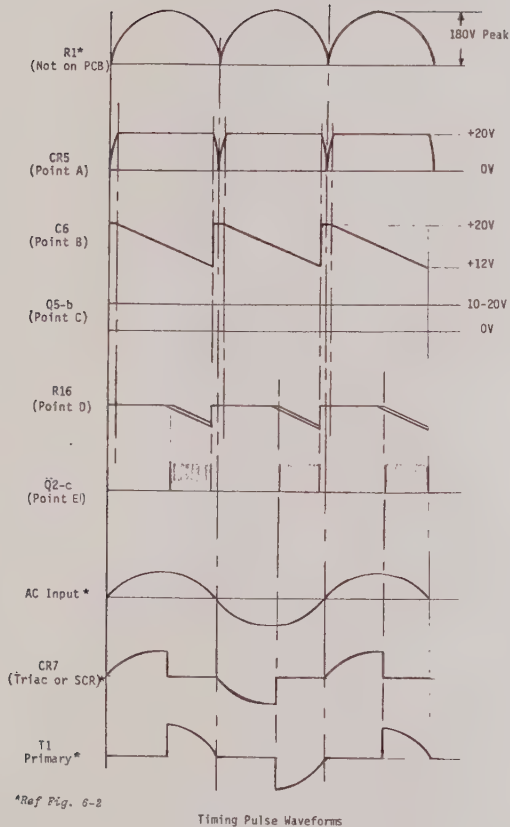
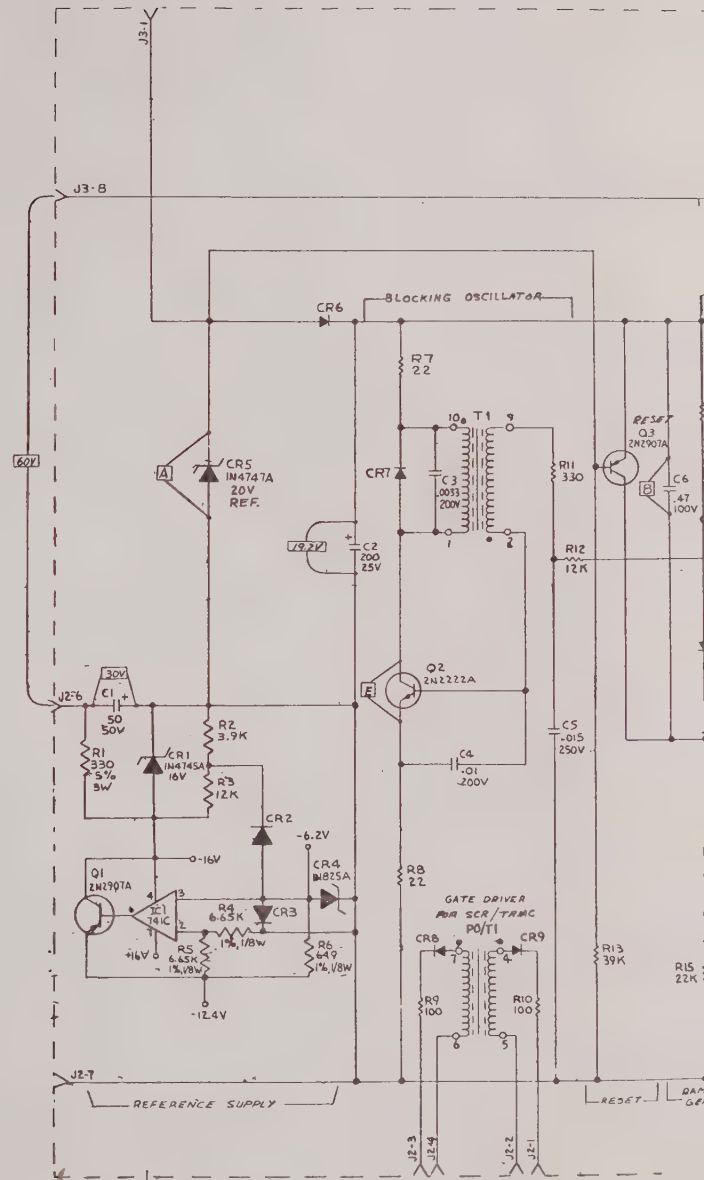


Figure 6-4
DCR-B Main Assembly Schematic Diagram
(Typical 2700 Watt)

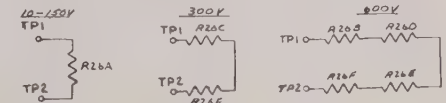


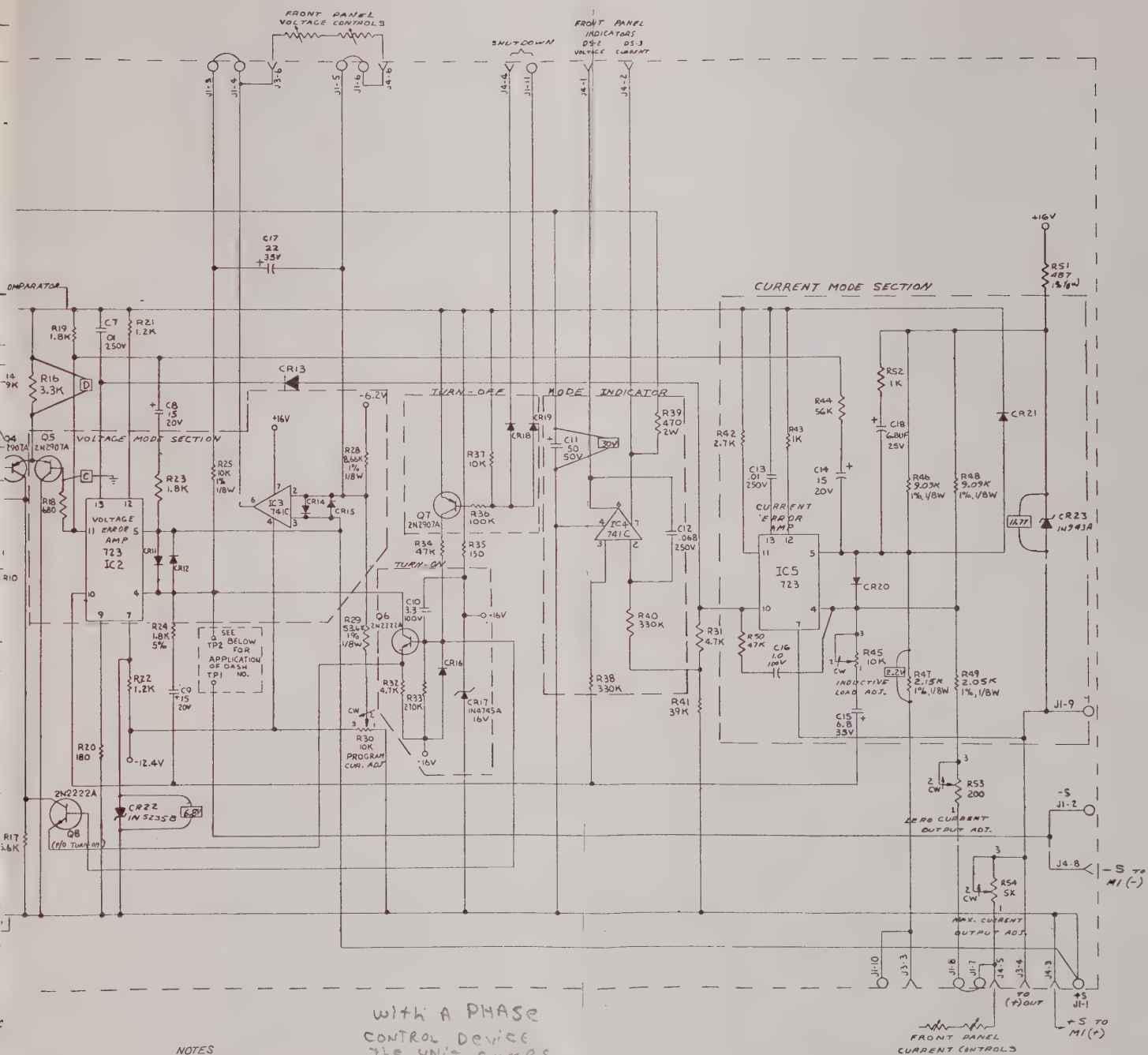
TYPICAL FAILURES

Q1
C1
IC3
IC2



UNIT	R26A	R26B	R26C	R26D	R26E	R26F
10-40	10K±1%	—	—	—	—	—
20-25	20K±1%	—	—	—	—	—
40-13	40K±1%	—	—	—	—	—
60-9	60K±1%	—	—	—	—	—
80-6	80K±1%	—	—	—	—	—
150-3	150K±1%	—	—	—	—	—
300-1.5	—	—	150K±1%	—	—	150K±1%
600-0.75	—	—	150K±1%	150K±1%	150K±1%	150K±1%

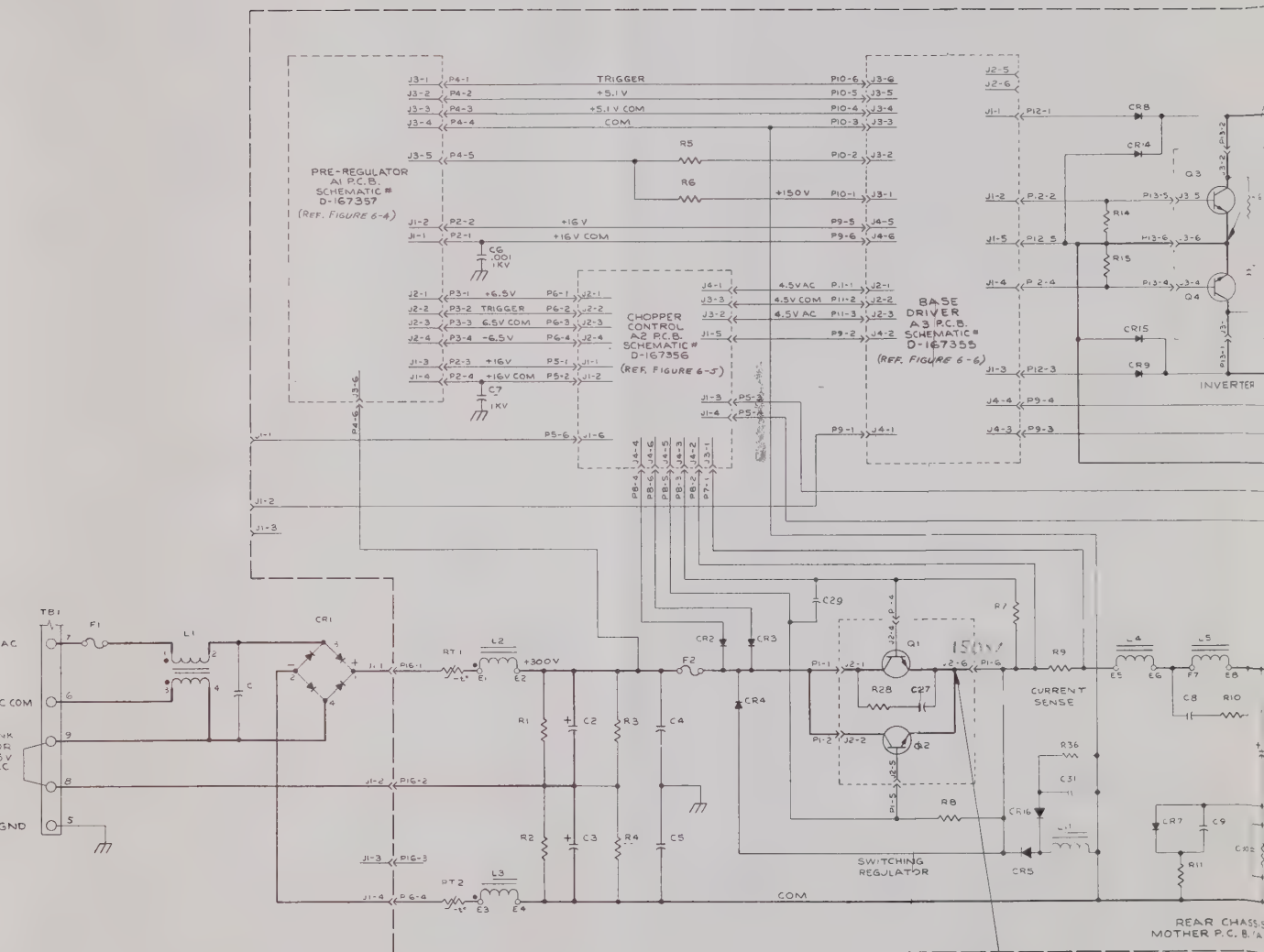




NOTES

1. UNLESS OTHERWISE SPECIFIED RESISTOR VALUES ARE IN OHMS.
2. UNLESS OTHERWISE SPECIFIED ALL RESISTORS ARE 1/2 WATT, $\pm 10\%$.
3. UNLESS OTHERWISE SPECIFIED CAPACITOR VALUES ARE IN MICROFARADS.
4. UNLESS OTHERWISE SPECIFIED ALL DIODES ARE 512.

Figure 6-1
DCR-B PCB Schematic Diagram
(All Models)



DWG. D167971 REV F (SPECIAL)

Q1/Q2 DRIVE CURRENT
(F2 REMOVED)
[MEAS. AT GRN WIRE - Q14/Q16]

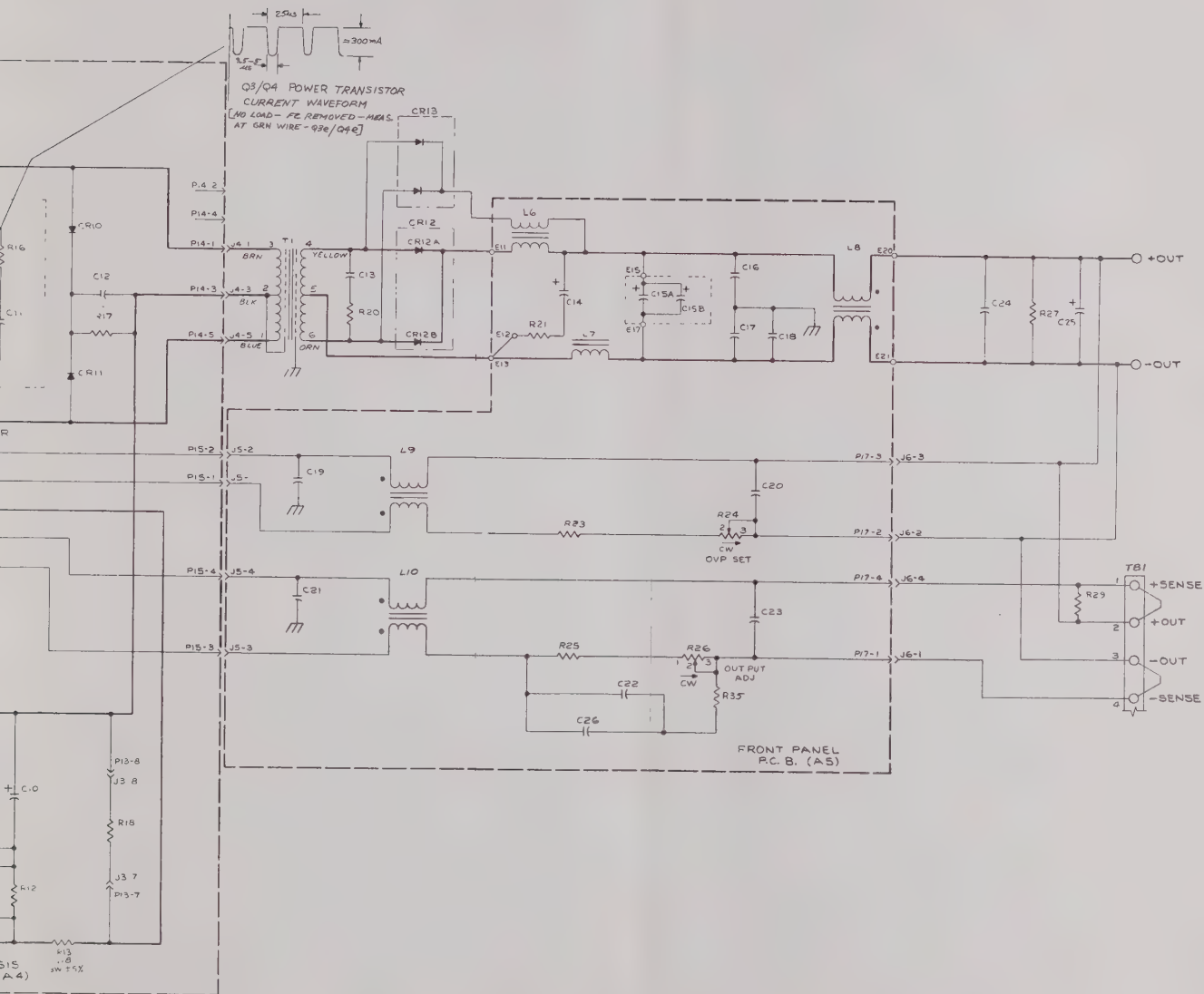
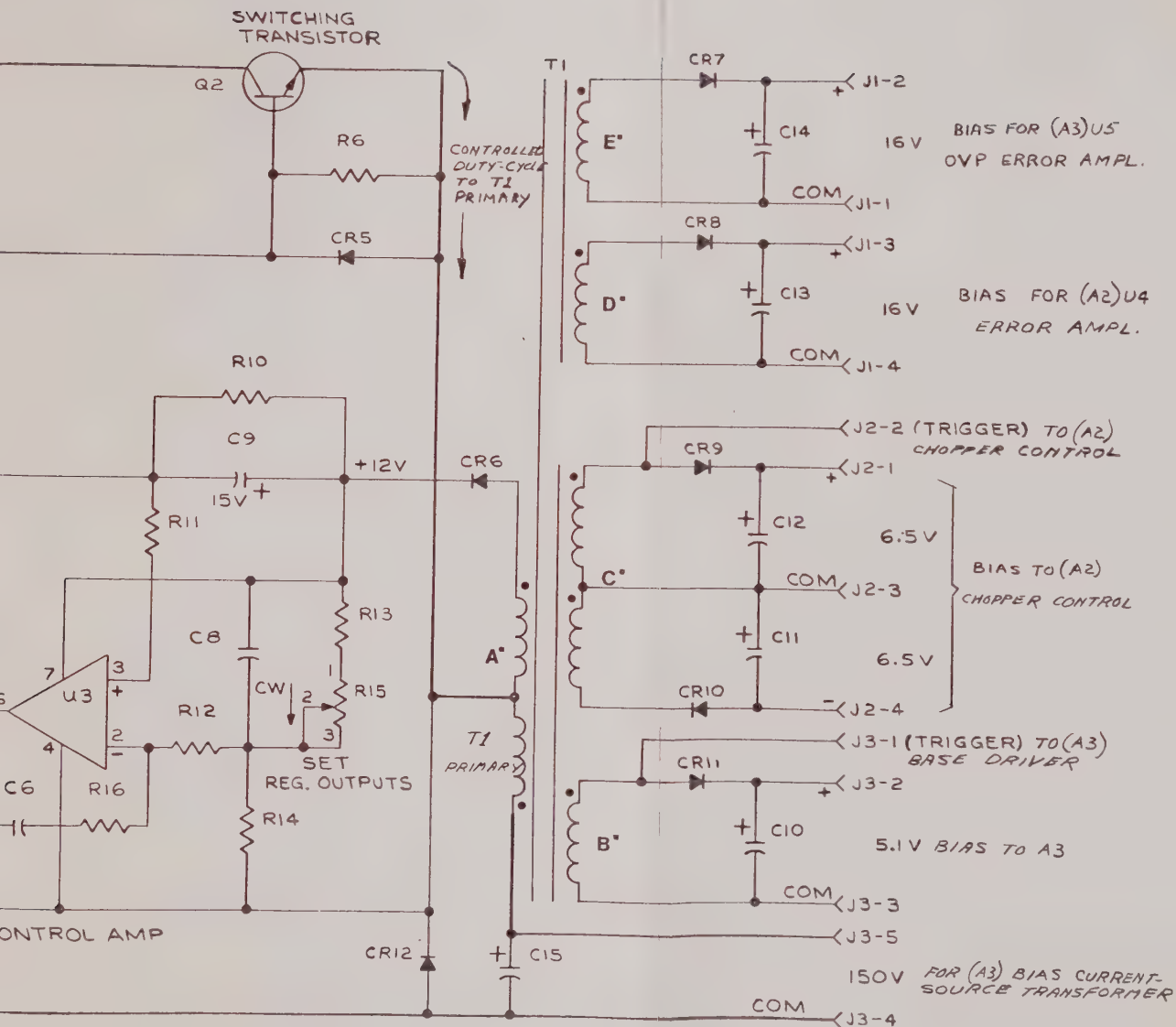


Figure 6-3
SSD Module IIIA System Schematic Diagram

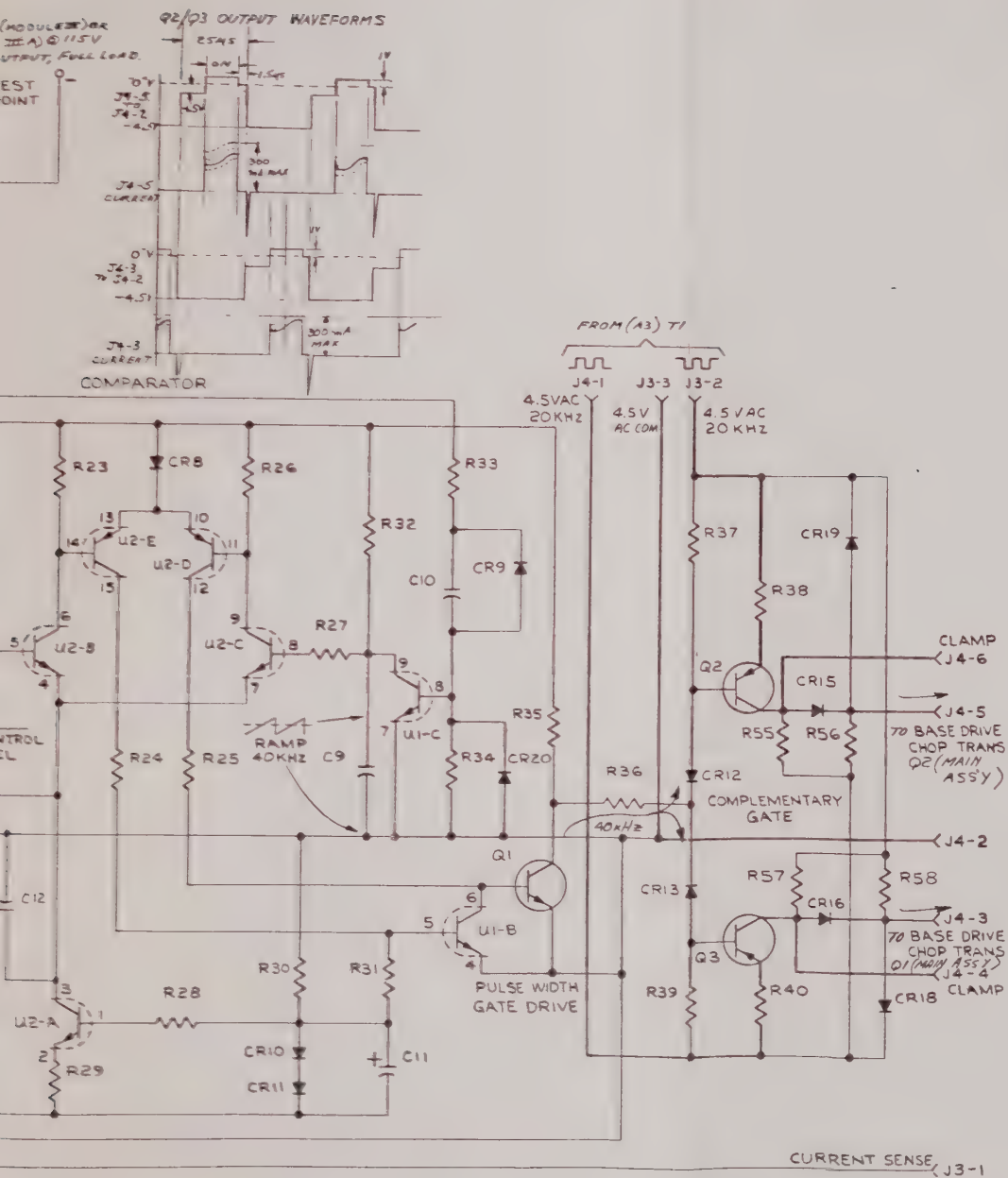
CIRCUIT SYMBOL	SSD MODEL										DESCRIPTION	SORENSEN PART NUMBER	MANUFACTURER, TYPE
	2-45	5-45	9-30	12-22	15-18	18-16	24-13	28-11	36-8	48-6			
											<u>Diodes</u>		
CR1	x	x	x	x	x	x	x	x	x	x	Bridge, Rect.	980893-3	VARO, VK647
CR2	x	x	x	x	x	x	x	x	x	x	600 V, 1A	586379-8	SEM, S1F6
CR3	x	x	x	x	x	x	x	x	x	x	600 V, 1A	586379-8	SEM, S1F6
CR4	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR5	x	x	x	x	x	x	x	x	x	x	400V, 6A	165360-5	MA, 1N3883
CR6	x	x	x	x	x	x	x	x	x	x	Not used		
CR7	x	x	x	x	x	x	x	x	x	x	200V, 1A	586378-1	SEM, 3SF1
CR8	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR9	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR10	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR11	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR12	x	x	x	x							Not used		
CR12A/ B	x	x	x	x		x	x	x	x	x	200V	586462-3	SEM, SCPA2F
CR13	x	x	x	x		x	x	x	x	x	SD51	165196-1	TRW, SD51
											Not used		
											Not used		
											200V	586462-3	SEM, SCPA2F
CR14	x	x	x	x	x	x	x	x	x	x	Not used		
CR15	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
CR16	x	x	x	x	x	x	x	x	x	x	600V, 1A	586379-8	SEM, S1F6
											SEN-R-42	586378-4	SEM, 3SF1
											<u>Fuses</u>		
F1	x	x	x	x	x	x	x	x	x	x	8A, 250V	42-430	BUS, ABC
F2	x	x	x	x	x	x	x	x	x	x	4A, 250V	226-7176P56	BUS, MTH
											<u>Inductors</u>		
L1	x	x	x	x	x	x	x	x	x	x	Input RFI Choke	168217-1	SR
L2	x	x	x	x	x	x	x	x	x	x	RFI Choke	167944-1	SR
L3	x	x	x	x	x	x	x	x	x	x	RFI Choke	167944-1	SR
L4	x	x	x	x	x	x	x	x	x	x	Input Filter	167942-1	SR
L5	x	x	x	x	x	x	x	x	x	x	Input Filter	167941-1	SR
L6	x	x									Output Filter	167951-1	SR
			x									167952-1	SR
				x								167953-1	SR
					x							167954-1	SR
						x						167955-1	SR
							x					167956-1	SR
								x				167957-1	SR
									x			167958-1	SR
										x		167959-1	SR
L7	x	x		x		x	x				Output Filer	167962-1	SR
			x	x								167219-1	SR
					x	x	x					167963-1	SR
								x				167964-1	SR
									x	x		167965-1	SR
L8	x	x									Output RFI	167968-1	SR
			x	x								167968-2	SR
					x	x	x	x	x	x		167968-3	SR
L9	x	x	x	x	x	x	x	x	x	x	Choke	586471-1	SR
L10	x	x	x	x	x	x	x	x	x	x	Choke	586471-1	SR

CIRCUIT SYMBOL	SSD MODEL										DESCRIPTION	SORENSEN PART NUMBER	MANUFACTURER, TYPE
	2-45	5-45	9-30	12-22	15-18	18-16	24-13	28-11	36-8	48-6			
											Capacitors (uF except as noted)		
C1	x	x	x	x	x	x	x	x	x	x	0.10, 500V	235-7207P41	SP, Y5V
C2	x	x	x	x	x	x	x	x	x	x	1,000, 200V	586052-1	STM, 91C
C3	x	x	x	x	x	x	x	x	x	x	1,000, 200V	586052-1	STM, 91C
C4	x	x	x	x	x	x	x	x	x	x	0.01, 1.6KV	235-7207P30	SP, Y5U
C5	x	x	x	x	x	x	x	x	x	x	0.01, 1.6KV	235-7207P30	SP, Y5U
C6	x	x	x	x	x	x	x	x	x	x	0.001, 1kV	235-7421P14	RDM, JF
C7	x	x	x	x	x	x	x	x	x	x	0.001, 1kV	235-7421P14	RDM, JF
C8	x	x	x	x	x	x	x	x	x	x	470pF, 300V	235-7053P156	SAN, 015
C9	x	x	x	x	x	x	x	x	x	x	1.0, 100V	24-2037-19	SE, MMK
C10	x	x	x	x	x	x	x	x	x	x	75, 300V	167816-2	SAN, 066
C11	x	x	x	x	x	x	x	x	x	x	390pF, 500V	235-7053P314	SAN, 015
C12	x	x	x	x	x	x	x	x	x	x	0.22, 250V	24-2015-17	SE, MMK
C13	x	x	x	x							0.001, 1kV	235-7421P14	RDM, JF
C14	x	x			x	x	x	x	x	x	Not used		
			x	x							220, 10V	586057-10	UC, MIL
					x	x	x				100, 20V	586385-10	UC, T110
								x			47, 35V	586058-27	UC, MIL
									x		18, 50V	585071-44	UC, MIL
C15A/B	x	x								x	10, 75V	586386-8	UC, MIL
			x								13,000, 10V	167817-1	MG
				x							7,600, 15V	167817-2	MG
					x	x					6,400, 20V	167817-3	MG
							x				4,700, 25V	167817-4	MG
								x			4,100, 30V	167817-5	MG
									x		3,000, 40V	167817-6	MG
										x	2,200, 50V	167817-7	MG
											1,200, 75V	167817-8	MG
C16	x	x	x	x	x	x	x	x	x	x	0.1, 500V	235-7207P41	SP, Y5V
C17	x	x	x	x	x	x	x	x	x	x	0.1, 500V	235-7207P41	SP, Y5V
C18	x	x			x	x	x	x	x	x	0.1, 500V	235-7207P41	SP, Y5V
			x	x	x	x	x	x	x	x	Not used		
C19	x	x	x	x	x	x	x	x	x	x	0.001, 1kV	235-7421P14	RDM, JF
C20	x	x	x	x	x	x	x	x	x	x	0.22, 100V	24-2037-11	SE, MMK
C21	x	x	x	x	x	x	x	x	x	x	0.001, 1kV	235-7421P14	RDM, JF
C22	x	x	x	x	x	x	x	x	x	x	0.22, 100V	24-2037-11	SE, MMK
C23	x	x	x	x	x	x	x	x	x	x	0.22, 100V	24-2037-11	SE, MMK
C24	x	x	x	x	x	x	x	x	x	x	0.22, 100V	24-2037-11	SE, MMK
C25	x	x									220, 10V	586057-10	UC, MIL
			x	x							100, 20V	586385-10	UC, T110
					x	x					47, 35V	586058-27	UC, MIL
							x	x			18, 50V	585071-44	UC, MIL
									x	x	10, 75V	586386-8	UC, MIL
C26	x	x									Not used		
			x				x				,068, 250V	24-2015-11	SE, MMK
C27	x	x	x	x	x	x	x	x	x	x	0.033, 200V	24-2015-7	SE, MMK
C28	x	x	x	x	x	x	x	x	x	x	220pF, 500V	235-7053P286	SAN, 015
C29	x	x	x	x	x	x	x	x	x	x	Not used		
C30	x	x	x	x	x	x	x	x	x	x	0.01, 200V	24-2409-7	AC, V146XR
C31	x	x	x	x	x	x	x	x	x	x	0.56, 100V	587626-6	SE, 105
											0.47, 250V	24-2015-21	SE, MMK

*Includes components on rear chassis (A4) and front panel (A5) circuit boards (Figures 6-7/6-8)

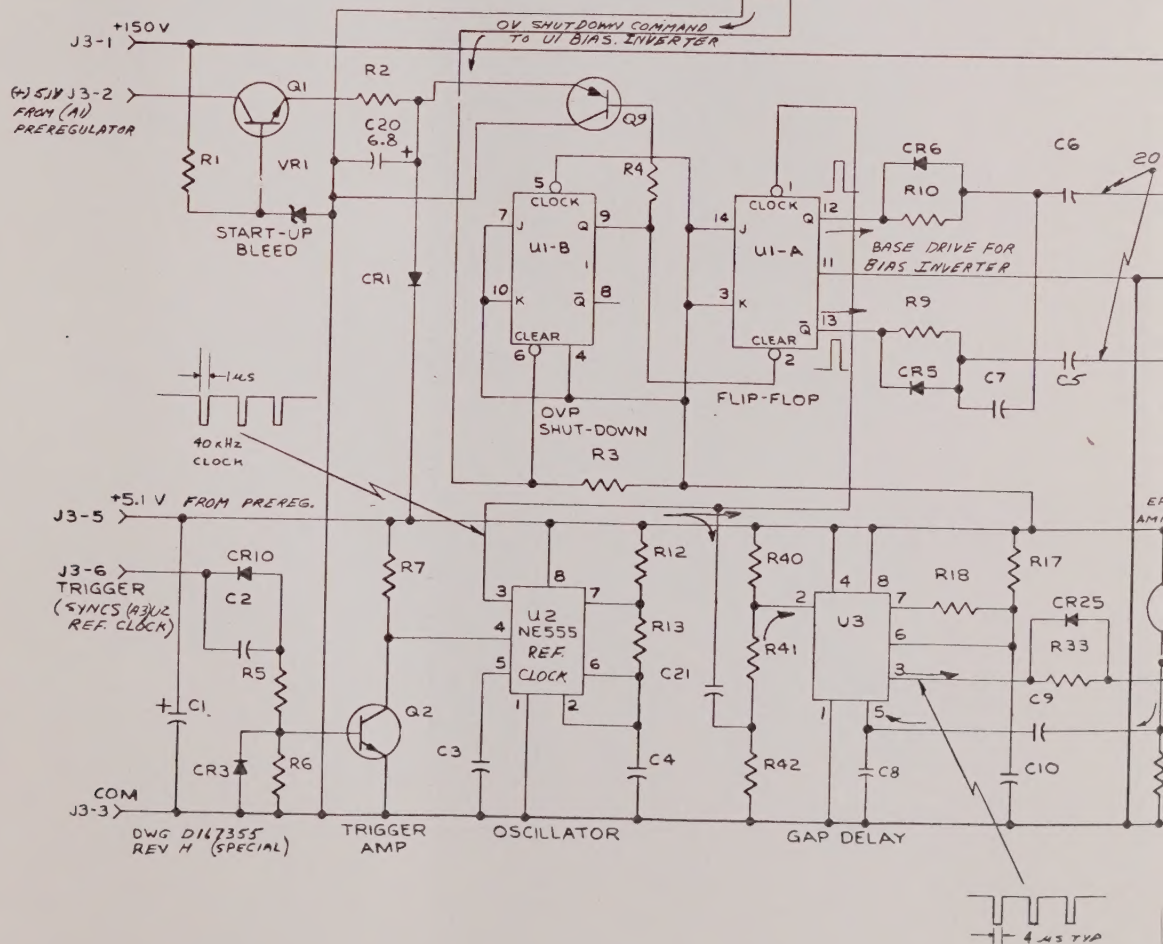
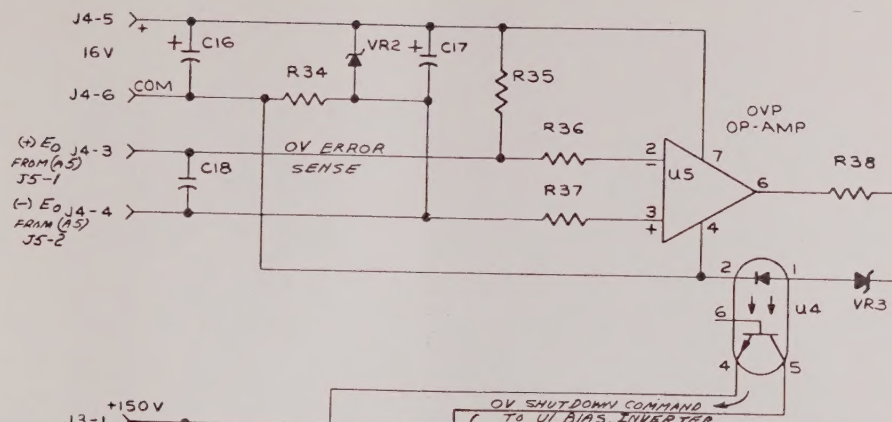


SSD Figure 6-4
(A1) Preregulator Circuit Board Diagram
Module III and IIIA



SSD (A2) Chopper Control Circuit Board Diagram
Modules III and IIIA

6-13/6-14



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